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The AUTOMOBILE

France Has 120,000 Automobiles Of All Types in Use

French Car Construction as Seen at Paris Show—Electric Lighting and Starting Systems in Use—Changes in Leading French Cars Described and Illustrated

By W. F. Bradley

PARIS, FRANCE, Oct. 25—It was particularly fitting that the automobile population in France should have been announced during the last few days of the Paris show, in that these records offer fruitful ground for study. France possesses today 90,959 privately owned automobiles on which taxes were paid to the state during the year 1913. This is an increase of 14,188 for the year and is the largest increase ever recorded.

The average horsepower as determined for taxation purposes is 13. This corresponds to a four-cylinder of 3.1 by 5.1 inches.

The greatest number of cars is to be found in the Seine département, which comprises the city of Paris, the figures for the year being 15,219, an increase of 1,830 during the year. Seine et Oise département comes second with 3,867 automobiles, followed by Nord with 3,300, Seine Inferieure with 2,825, and the Rhone (including Lyons) with 2,264. At the bottom of the list is Corsica with only 23 automobiles. The barren Lozere département possesses 66 cars; the High Alps have 77, and the lower Alps 120.

Although the returns are perfectly accurate, they do not indicate the total number of cars in daily circulation in France. In addition to privately owned cars which pay direct taxes to the state, there are a number which are indirectly taxed, or not taxed at all, and these do not figure in the statistics. Taxicabs, motorbuses, postal vans, all commercial vehicles, cars used in private hiring service and manufacturers' test cars are excluded. In Paris alone there are probably 10,000 motor vehicles which do not pay direct taxes, thus making a total of more than 25,000 cars for the Seine département, instead of the official 15,219.

As there are no returns on cars subject to indirect taxation, all estimates are somewhat vague. Probably the total number of motor vehicles in service in the whole of France is about 120,000. The following table shows the number of private cars (excluding taxicabs, trucks, motorbuses and motorcycles) on which taxes have been paid from 1899 to the present year:

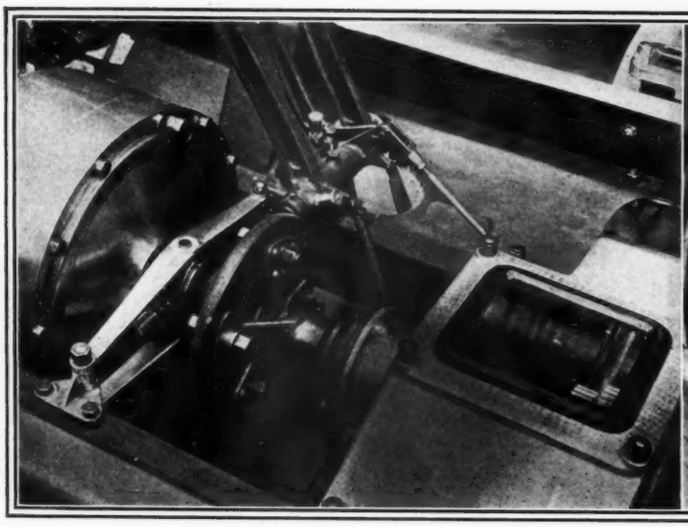
Number of privately owned automobiles in France to date is:

Year	Cars	Increase	Average hp.
1899	1,672	.....	4
1901	5,386	3,714	5
1902	9,207	3,821	5
1903	12,984	3,777	6½
1904	17,107	4,123	7
1905	21,523	4,416	8
1906	26,262	4,739	9½
1907	31,286	5,024	10½
1908	37,586	6,300	11½
1909	44,769	7,183	12½
1910	53,669	8,900	13
1911	64,209	10,540	13
1912	76,771	12,562	13
1913	90,959	14,188	13

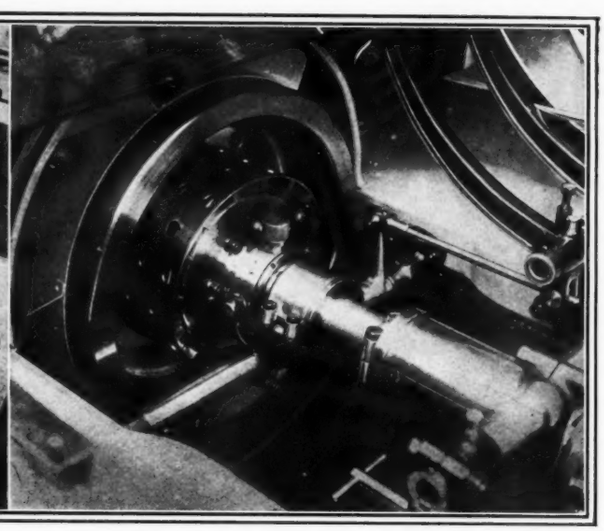
Unit Construction Has Small Gain

Compared with a year ago, there has been very little increase in the unit construction of motor and gearbox. Panhard has extended it to practically all models, but with this exception the unit construction is most common on small-powered cars. There is no uniformity in design and no one class which predominates over the others. There are three main classes of design represented at the Paris Salon: unit construction in which the power plant serves to stiffen the frame, generally known here as the armored type; unit construction with three-point suspension, and unit construction with a rigid attachment. In the armored class are Piccard-Pictet, Abadal, Hispano-Suiza, and Despagna. In this class the lower portion of the gearbox and of the crankchamber are mounted directly on the frame members, with full webs, and tend to stiffen the whole construction. The upper portion of the crankchamber is carried on this bed, and the cylinders mounted on it in the usual way.

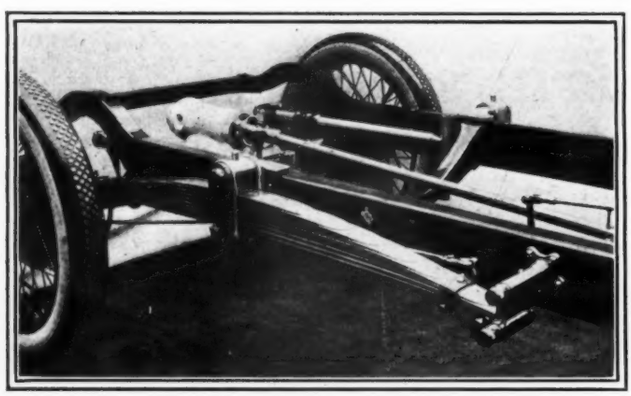
Unit construction with three-point suspension is adopted by Panhard, De Dion Bouton, and D. F. P. By far the largest number in the unit-construction class have either five or six-point attachment; four points for the motor, and either one or two points for the rear of the gearset. La Buire is a good example of five-point suspension, the motor having a rigid four-point attachment to the main frame members, and the rear



Stout leather coupling between the clutch and gearbox on the Humber chassis



Exposed multiple-disk clutch on the Delaunay-Belleville chassis, a new feature for 1914



Cantilever rear spring suspension on Bellenger chassis; also showing overhead worm drive and two short torque members

of the gearbox having a spring attachment to an underswept frame cross-member. Motobloc, with unit construction, has integral frame-member extensions, allowing the power plant to be mounted direct.

The Gobron and the Vermorel, with separate construction of motor and gearbox, have a somewhat similar mounting, but instead of the extensions being an integral part of the frame members they are riveted on to these latter. In most of these unit constructions the motor and gearbox are separate aluminum castings bolted together.

On the Rolland-Pilain the base chamber, the cradle round the flywheel and clutch, and the lower portion of the gearbox form a single casting. A few of the Italian makers have adopted this same construction. Aluminum is used almost exclusively for these castings. The only important example of cast steel is on the new Darracq, where it is used for the gearbox only, and the Briscoe appears to be the only car making use of cast iron; in this case cylinders and basechamber are a single casting.

Bellenger Gearbox Mounting

In connection with the mounting of motors and gearboxes, the Bellenger method is interesting. The box is suspended from its center line at extreme front and rear to a couple of transverse frame members. It is maintained horizontal in a transverse direction by an attachment from a lug on the right-hand side of the box to the right-hand frame member, this attachment being adjustable and the adjusting screw having a yoked end. One of the gearboxes produced by this firm has chain drive. This is the only example of a chain-driven box.

More and more uniformity is being shown with regard to the method of taking the drive. The method under which the springs are relied on for both drive and torque, there being two universal jonts on the propeller shaft, is increasing every year. It is the system adopted by Delage, Hotchkiss, Hispano-Suiza, Unic, Abadal, Sizaire-Berwick, Piccard-Pictet, etc., and represents 47 per cent. of the cars in the exhibition hall. The second is the method in which the propeller shaft is inclosed in a torque tube supported in its forward end by a ball and socket or some form of yoke, this member taking care of both drive and torque. It shows a slight decrease since last year and is found on 24 per cent. of the cars. Reliable statistics have been kept on this subject for the last four Paris shows, and are:

Figures on Drive Methods

	1908	1910	1912	1913
Drive and torque through springs	8%	17%	33%	47%
Tubular member for torque and drive	9%	23.5%	27%	24%
Drive through springs, separate torque member	36%	27.7%	16%	10%
Drive through springs, tubular torque member	10%	9%	11%	8%
Drive through radius rods, tubular torque member	14%	12.5%	7.6%	5%
Drive through radius rods, torque taken by springs	14%	....	2%	4%
Drive through radius rods, separate torque member	9%	6.8%	2%	2%

Cyclecar Shows Growth

This year has seen an important development in the type of small cars having a very close connection with the cyclecar. The two-passenger machine which is a development of the motorcycle, and is best represented by the Bedelia type, shows very little increase in numbers. On the other hand, the diminutive cars, really forming a connecting link between the cyclecar and the touring car proper, have been produced in very large numbers. Bedelia, Automobilette, Super, etc., represented the belt-driven, tandem-seating cyclecar. The Ajax, Violet-Boget, Violette, Baby-Cid, comply with the official definition of a cyclecar, but are of a slightly more elaborate order than the first class. The intermediate class comprises machines having a four-cylinder motor of about 2.3 by 3.9 inches bore and stroke, cone clutch, selective gearset with either three or four speeds, and bevel-driven rear axle. They nearly all take the drive and the torque through semi-elliptic rear springs. This type of car has been built by Buchet, Alcyon, Charron, Bayard-Clement, F. N., Sigma, Ponette, H. L., Zebre, and a dozen others. There is a striking uniformity in the design, enhanced somewhat by the fact that the motors in most cases are secured from specialists. It is obvious that a car of this type selling complete from $800 to $1,000 cannot meet the requirements of motorists interested in the cheap belt-drive machines, yet the French makers appear to see a greater future in the small car than in the pure cyclecar.

Electric Systems at Paris Show

French and English Types Used—Americans Very Well Represented in Generator and Starter Field

WHILE the use of electric charging generators is now well established in England and America, it might be fairly stated that continental Europe is just waking up to it. France, a pioneer in the production of one or two excellent but expensive lighting systems for motor cars, is now producing in the neighborhood of a dozen different designs of lighting sets, of which the S. E. V. is the leader.

S. E. V. Is the Leader

Hand in hand with the lighting systems come the electric motor starters and all of these except one, the C. A. V. on the Austin, are of American make. Most of these, too, are to be seen on the American cars exhibited, excepting the Jesco and Westinghouse systems, which are on two well-known French cars, the Jesco on the Gregoire, and the Westinghouse on the Panhard. The Renault is equipped with a starter.

The Bosch, Mea and Eisemann companies are working on starting systems as well as lighting systems, and many companies are endeavoring to hold out until these concerns have shown their products.

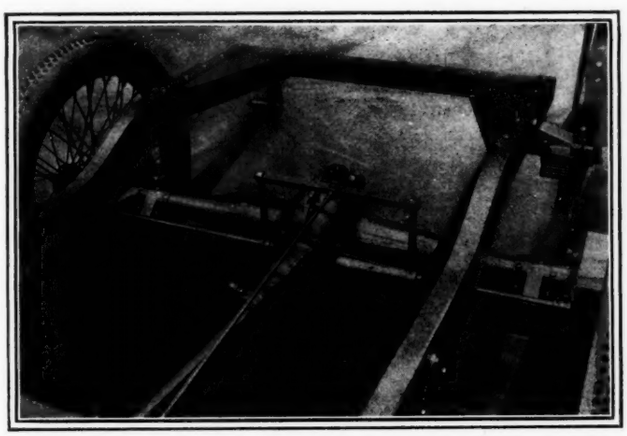
There are many interesting features, particularly in the methods of driving and releasing the generators, and the means of connecting the motors for starting.

The Berliet uses an S. E. V. lighting system driven by a leather V-belt and a friction pulley on the flywheel. The generator illustrated in last week's issue pierces the dash so that the end containing the magnetic current regulator is accessible. The driving end is in front of the dash, and a V-belt connects between the generator pulley and a pulley on a movable shaft having the friction wheel or pulley at its opposite end. The regulation of the battery charging consists in disconnecting the driving pulley by lifting it away from the face of the flywheel, which is to be done by hand with a crank on the dash. When this crank is turned 180 degrees in one direction the friction pulley is raised out of contact with the flywheel and at the same time the V-belt is slackened and the generator ceases to operate. Turning the handle the other way again brings the friction pulley against the flywheel and tightens the belt between its pulleys simultaneously. Provision also is made for the support and drive of an electric starting motor on the right side of the gearbox.

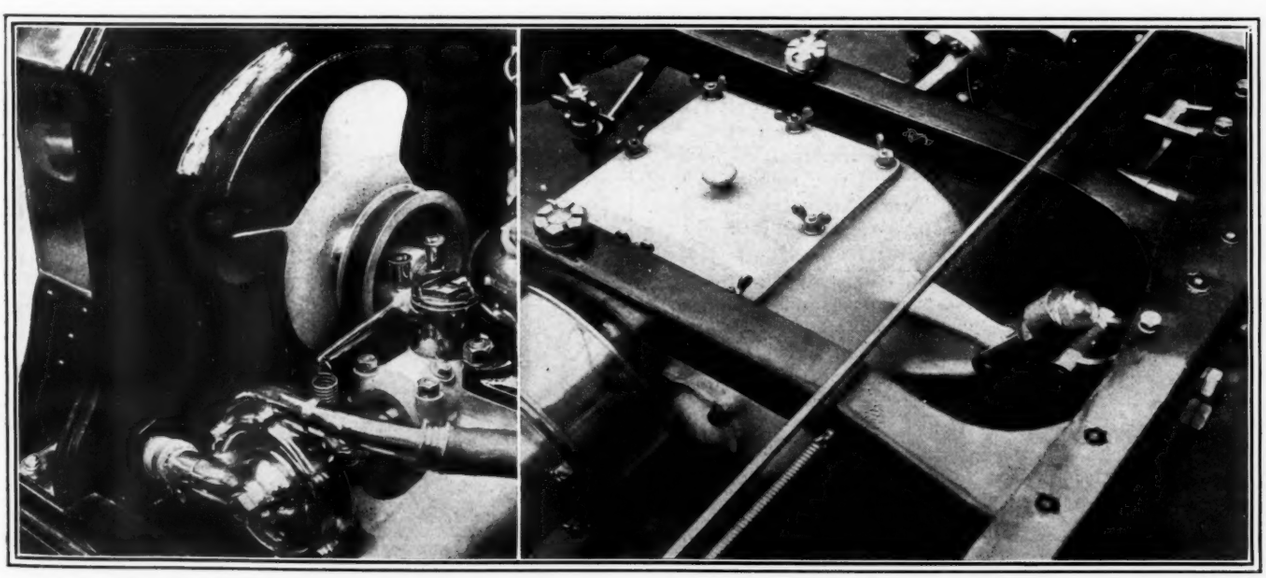
Panhard Fits Electric Starter

Panhard employs the S. E. V. system in combination with the Westinghouse starting motor and has the generator arranged in the dash so that it is driven by an inclosed silent chain from the crankshaft. A single metal strap holds it in place. The starting motor occupies a good position at the left rear between the motor and the frame. It drives through a pinion meshing with the flywheel teeth. A pedal meshes the pinion and then closes the starting switch.

The Austin car has its C. A. V. generator arranged as in the Panhard, but driven by inclosed offset gearing, and V-belt and pullleys. This drive is taken from the rear end of the camshaft. The starting motor marks the first public appearance of the C. A. V. starter. The C. A. V. is England's most popular lighting outfit at present. It is fitted to several makes of English cars for trial, however, and is said to be standard equipment

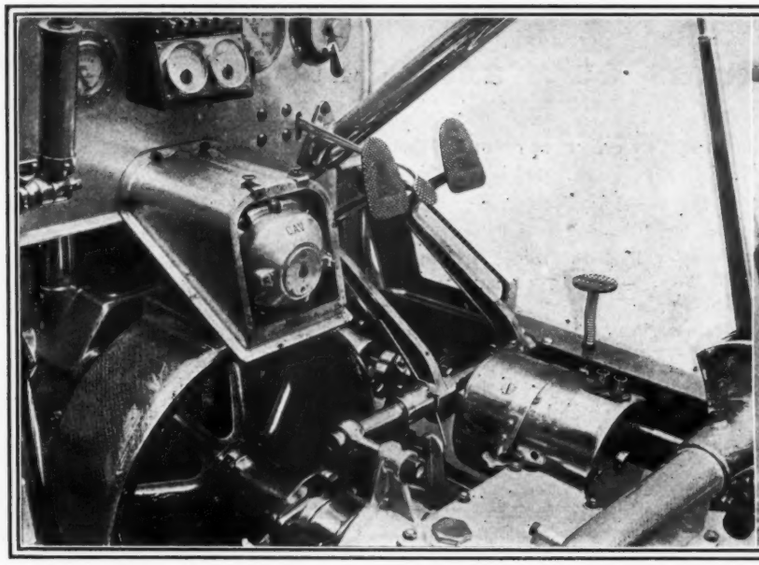


Motobloc rear axle with funnel-shaped housing and novel form of brake equalizer

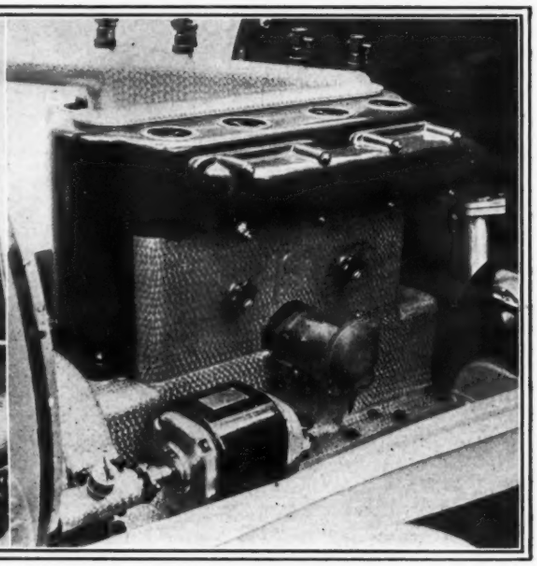


Ventilator tunnel attached to radiator and heavy aluminum fan on Bellenger

Bellenger gearbox supported through two trunnions and one adjustable support. The adjustable support is shown at the right



Pilain motor, showing generator mounted low on the valve side leaving the valves and valve springs entirely accessible. Note accessible location of horizontal type Zenith carbureter



Austin motor with charging dynamo carried in housing above flywheel and starter motor at right of gearbox. The C. A. V. Electric generating system for battery charging is used

on the 1914 Daimler. On the Austin the starting motor is arranged between the gearbox and the frame, in a position just under the front floorboards. Its power is transmitted through a series of flexible shaft couplings, and thence by means of a triple-flanged or corrugated friction pulley to the flywheel. The three flanges of the pulley are jammed into grooves in the flywheel so that suitable grip may be obtained. A pedal throws the friction wheel in and out of contact with the flywheel.

Gregoire Uses Jesco Starter

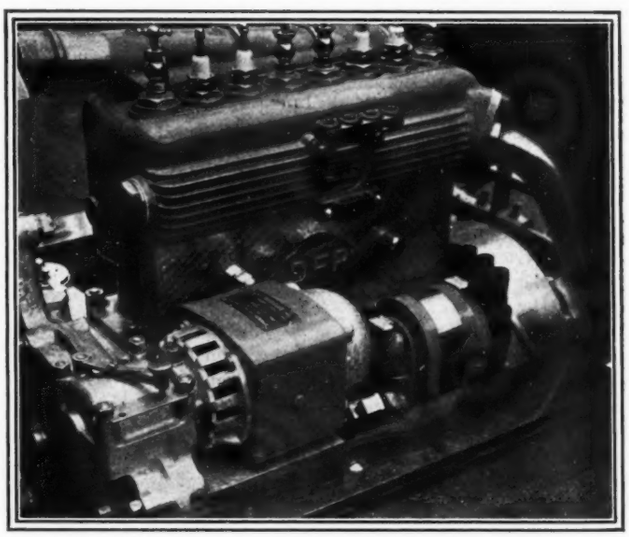
The Gregoire, equipped with the Jesco system, has mounted this combined unit dynamo-motor on the right of the motor in front of the base of the steering column, where it drives through a heavy, self-centering chain to a larger gear on the front end of the crankshaft. The fan-belt pulley is in front of this gear and in unit therewith.

Hotchkiss uses the cross-shaft to drive its S. E. V. generator, which is nicely arranged behind and parallel with the radiator on the right, this permitting the cover to be easily removed from the charging control mechanism, which is automatic and magnetic.

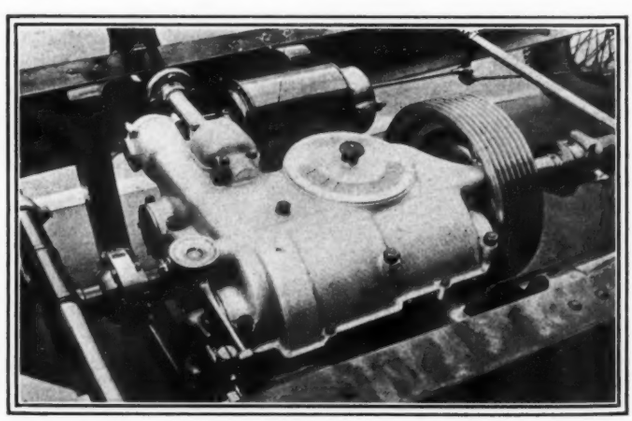
De Dion Has Bosch Outfit

The De Dion eight-cylinder is fitted with the new Bosch 12-volt lighting system. The generator rests in a cradle secured to the lower left side of the gearbox, a steel strap holding it in place and this having a readily detachable buckle to facilitate removal of the unit. The generator is driven by a leather friction disk from the interior of an over-lapping steel ring secured to the periphery of the flywheel. This internal arrangement of the friction pulley gives a greater surface of contact than if the wheel were on the outside face of the flywheel, and it also facilitates attachment of the generator. The proper reduction is provided by the Bosch gearing, comprising a pair of gears inclosed in a case hanging movably suspended from a shaft projecting from a frame cross member. A coil spring forms the flexible driving connection between the reduction gearing and the generator shaft, and permits the friction pulley to be drawn out of contact with the flywheel ring.

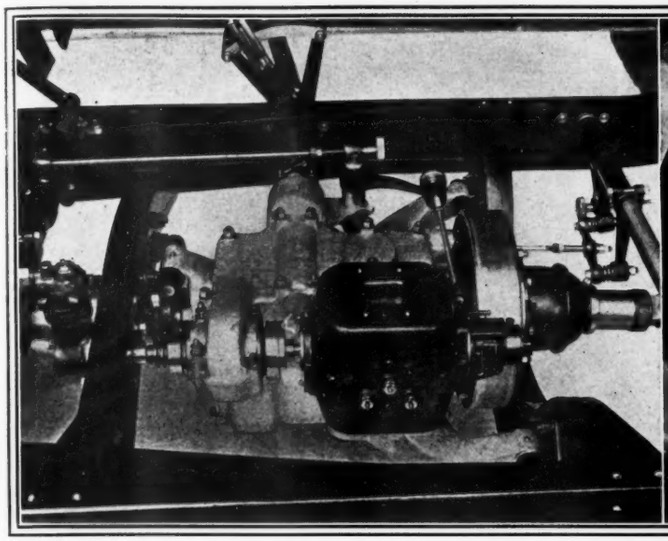
Isotta is equipped with the C. A. V. 12-volt system. The generator is mounted between the crankcase and the frame and its drive shaft passes through a long bracket secured to the front of this leg, and this is driven by a V-belt from the crankshaft. The Darracq also uses the C. A. V. system with the generator mounted on the right front engine leg and driven by V-belt from the crankshaft.



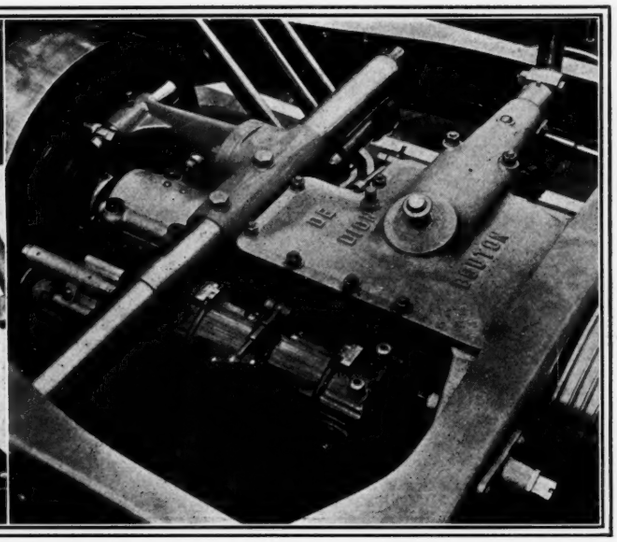
On the D. F. P. motor the dynamo can be brought into engagement as desired; the magneto is driven off a separate shaft from the dynamo



Berliet gearbox, showing mounting of electric starter at the right and connected up through the gearbox. Note accessibility of gearbox cover and handle for detaching



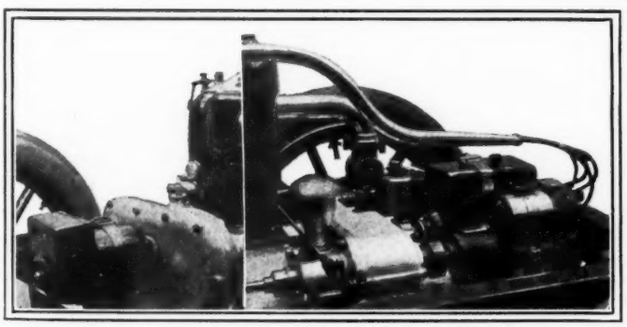
Promethée dynamo mounted by gearbox and driven through inclosed chain, which, in addition to driving the dynamo, drives the air pump mounted in advance of the gearset



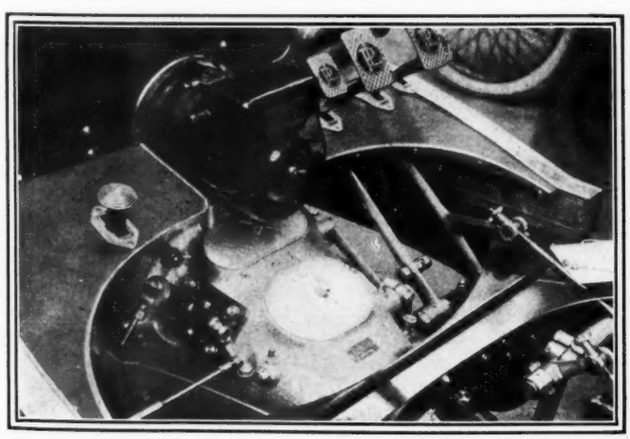
Electric starter on De Dion Bouton chassis. The starter drives through a friction wheel bearing against the inside of the periphery of the flywheel

Leading French Makes Described

Renault Has Added Selective Gearset — Darracq Markets Brand New Model—Peugeots New Forty—Charron Oiling System—Hotchkiss' Program



Novel methods of generator support. At the left is the mounting on the new Renault and at the right that of the new Clement



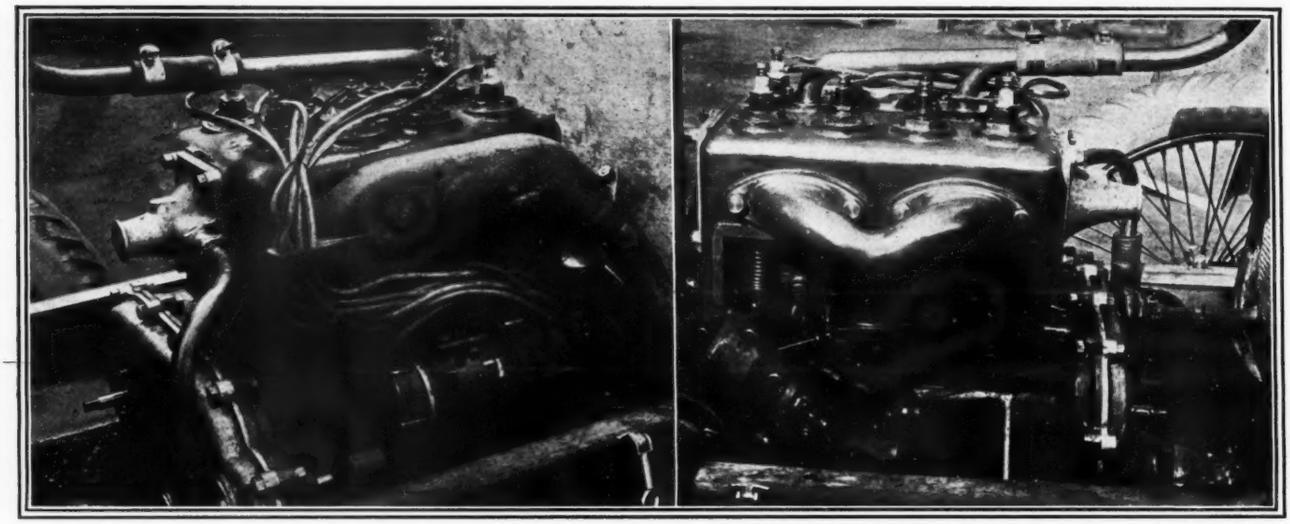
Panhard sporting type with electric dynamo brought through the dash for accessibility purposes. Note power air pump on gearset

RENAULT has produced one new model, a four-cylinder type of 95 by 160 mm. (3.7 by 6.29 inches) bore and stroke, officially rated at 18 horsepower, and illustrated in these pages last week. This new type, which will replace two of the 1913 models, comprises several new features. An electric lighting set is a standard equipment, the S. E. V. dynamo used is placed in front of the motor and is driven by a pinion, the latter driven by chain from the magneto shaft. The platform for the dynamo is integral cast with the crankchamber, the dynamo being held down by a flexible steel band, as in the case of the magneto.

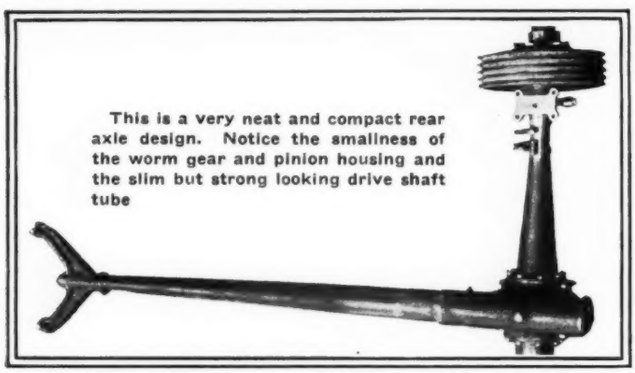
Renault is using chains for the first time this year. They are three in number: from crankshaft to camshaft, from crankshaft to magneto shaft, now placed on the right-hand side of the motor; and from magneto shaft to dynamo shaft mounted in the vertical plane of the crankshaft. The chains are not adjustable; and the distance between the centres is 5 inches. In order to accommodate the dynamo in front, which is really a most accessible position, it has been necessary to lengthen the bonnet. The extra length is taken ahead of the front axle, so as not to diminish the space available for the body. Owing to the necessity for lengthening the bonnet, it has not been possible to place the dynamo in this position on the smaller cars. The dynamo is set up as close to the timing gear housing as possible, no driving mechanism being visible. The use of the dynamo makes it necessary to place the Bosch magneto alongside the motor, on the right-hand side.

Renault Has Five-Bearing Crankshaft

For the first time, also, Renault has adopted a five-bearing crankshaft, in place of the three-bearing shaft used up to the present. With a view to simplicity, the intake piping has been entirely incorporated with the cylinder casting, and everything connected with the carbureter is now carried on the right-hand side. The carbureter, which has undergone but detail changes, is connected up by a straight length of piping having branch



Exhaust and carbureter sides of the Gregoire sporting type motor, which is one of the new models for 1914. Cylinders 2.7 by 5.5 inches



This is a very neat and compact rear axle design. Notice the smallness of the worm gear and pinion housing and the slim but strong looking drive shaft tube

Unique axle design on worm-driven Gregoire town car

arms connecting to each of the twin castings of the cylinders. This arrangement simplifies the valve side of the motor, making the valve springs perfectly accessible. These are naturally inclosed, the valve tappets are adjustable, and there is a breather between each pair of valves. The exhaust manifold is separate. The circulating lubricating system is practically unchanged. A three-way cock is fitted, with a steel stem attached to the handlle so as to form an oil gauge. The stem is graduated and can only be withdrawn when the cock is in the closed position.

Steel Flywheel with Greater Width

Instead of cast iron, the flywheel is now of steel and has a greater face width than the old one. The sheet metal fins are not riveted on, but are passed through slits in the wheel and their projecting end hammered over. Renault maintains the housing around the whole of the mechanism between clutch and gearbox. The lower half of this housing is an extension of the crankcase. The upper half is detachable and is held in position by a couple of hinged bolts and nuts. All the clutch withdrawing mechanism is contained within this housing, as well as a flexible coupling composed of steel disks. The housing is made oil tight.

Selective Four-Speed Gearset

The gearbox is an entirely new production, for this year, for the first time, Renault makes use of a four-speed gearset with selective change. The shafts are mounted one above the other, and the direct drive is at the front of the gearbox. The quadrant is small and is outside the frame member. The new box is hung to a couple of transverse frame members. This year's type of quick opening oil filler and level placed on the side of the box, has been maintained. There is practically no change in the final drive and in the rear axle, with the exception that the thrust bearing is now made adjustable from the outside. The footbrake is internal expanding, the drum being ribbed. Storage batteries are carried in a metal box hung to the inside of the right frame member, alongside the propeller shaft.

On two of the smaller Renault chassis, with specially dropped frame designed for town bodies, an electric self-starter is fitted. The motor is carried alongside the gearbox and drives by means of a friction disk in contact with the face of the flywheel. It is considered by Renault that a self-starter is most useful for town work with frequent stoppages and re-starting, and that there is not much necessity for it on a touring model.

3-Liter Racing Creates New Model

The direct influence of modern racing can be seen in the demand in France for what are popularly known as sporting type cars. These are light, speedy cars of small, or comparatively small cylinder area, but of very high efficiency. They are, to a very great extent, the outcome of the 3-liter racing movement. To meet this demand for higher speed than is possible with an ordinary type car, manufacturers are building special semi-racing motors or are modifying their standard motors with a view to higher power. This explains why the L-type motor is the generally accepted type and yet there are several cases in which manufacturers are adding T-types and overhead-valve types.

Darracq gets a sporting type by lightening the reciprocating parts, modifying the timing, and putting on a bigger carbureter; Panhard adopts similar methods with a Knight motor. Hispano-Suiza, who has always made T-type motors, has a new valve-in-the-head type for very fast work.

Gregoire Has New T-Type

Gregoire, with L-type as standard, has built a T-type for sporting purposes. This new motor is a four-cylinder monobloc of 70 by 140 millimeters (2.7 by 5.5 inches) bore and stroke. It has a two-bearing crankshaft, steel pistons, and big diameter valves with the stems inclined outwards. Rated at 20 horsepower, it is guaranteed to develop 38 horsepower at 2,800 revolutions and with two-seater body has a guarantee of 63 miles an hour. The radiator is a new model, with an unusually big header tank projecting ahead of the body of the radiator, and having its angles rounded off. The filler is big enough for a man to pass his hand into the radiator. The car has four-speed gearbox and bevel-driven rear axle of floating type. This axle has been redesigned and is built up of forged steel taper tubes and a centrally divided cast steel differential housing.

Gregoire has retained the two sets of brakes on the rear wheels, but has increased the diameter and fitted the shoes with ribs to assist cooling.

Last year a small power plant with unit construction was put on the market. This has undergone changes. The unit type motor and gearset has been put into a broader and longer chassis intended to receive closed bodies for town work. The motor is only 65 by 130 millimeters (2.5 by 5.1 inches) bore and stroke, but it is considered sufficiently high-powered for this class of work, the bodies fitted being coupes and coupe-limousines carrying four persons inside. The rear axle on this model is of the overhead worm type, as used last year on the roadster.

For the light roadster the same motor is used, but it is not a unit with the gearbox, and the worm rear axle has been replaced by a bevel. The change from a single to two units has been made on grounds of economy. It is declared that the reduction on the aluminum bill on a series of cars is considerable. The change from worm to bevel drive for the touring model may be taken as an indication that the latter is superior for fast road work. The demand for extreme quietness being removed, the Gregoire engineers consider that bevel drive has an advantage.

Darracq Drops Rotary Valve

The 1914 season will mark an entirely new period for Darracq. The Hanriod rotary-valve motor has entirely disappeared. As a big expenditure had been made on the detail improvement of this type of engine its complete withdrawal is evident proof that it has not proved as satisfactory as the poppet-valve type. The entire Darracq works have been turned over to an English engineer, Owen Clegg, formerly connected with Rover and Wolseley. Under the new management two models only are produced, this being in harmony with the general European tendency to cut down the number of types to the lowest possible quantity.

The two Darracqs are four-cylinder, poppet-valve models of 75 by 120 millimeters, 2.9 by 2.7 inches, and 85 by 130 millimeters, 3.3 by 5.1 inches. New features are a block motor with intake and exhaust manifold cast integrally, underneath worm drive, electric lighting as a standard equipment, a special streamline body, and such improvements as new suspension, new brakes, improved steering gear, etc.

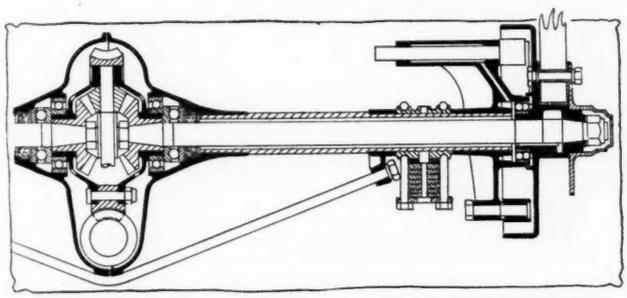
The new Darracq motor is distinctive by reason of its clean-cut appearance. It is no longer mounted on a subframe, but is carried directly on the main frame members and inclined in order to obtain a straight line-drive to the underneath worm. Cylinders are of the L-type, valve stems being inclosed and adjustable tappets having fiber heads. Silent chain drive is used. A broad chain goes from crankshaft to camshaft, and a narrower chain from camshaft to magneto and pump shaft. No adjustment is provided for the chains, for as the distance between the centers is only 5 inches it is declared that the amount of stretch is really negligible if the chains have been bedded in before sending the car out. An interesting departure is the use of cast-iron bearings for the camshaft. These have been given a most thorough tryout and have proved satisfactory in every respect. They have the advantage for the manufacturer of being cheaper than any other type of bearing. White metal is used for the connecting-rod bearings.

A leather disk flexible coupling is interposed between the magneto drive shaft and the magneto. The oil capacity has been increased to 10 pints, this oiling feature having received attention by nearly all European manufacturers. The system is the circulating type with direct delivery to the main bearings and a constant level trough for each connecting-rod. The oil filler acts as a breather.

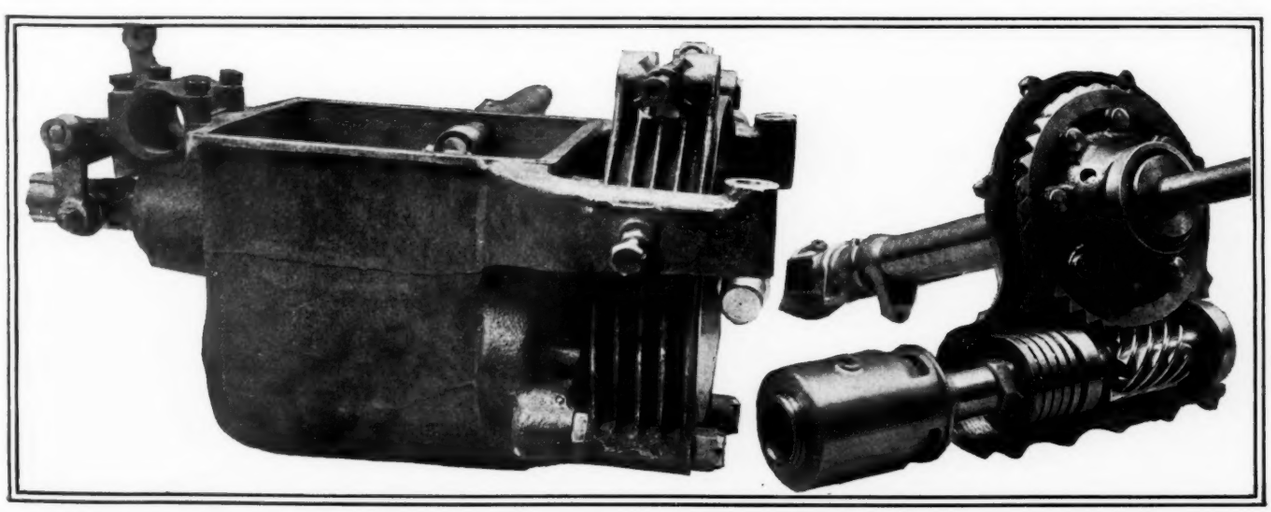
A new gearbox has been designed. It is of cast steel, carrying the two shafts in the same vertical plane, and is attached at the front to a tubular frame cross-member and at the rear has two arms encircling the brake drum and bolted to a stout channel section cross-frame member. Four speeds are used, this also applying to the smaller model.

The braking surface has been considerably increased and the foot-brake, which is external with ribbed shoes, has a drum measuring 2.7 by 9.4 inches. The rear wheel brakes are internal and same size. This may be taken as a fair average size for European cars of medium power.

The worm-driven axle is an entirely new departure, and one of its features is the particularly robust mounting of the worm wheel. The underneath placing of the worm solves most of the lubrication difficulties, but as an extra precaution a liberal space has been left in the base of the housing for containing a

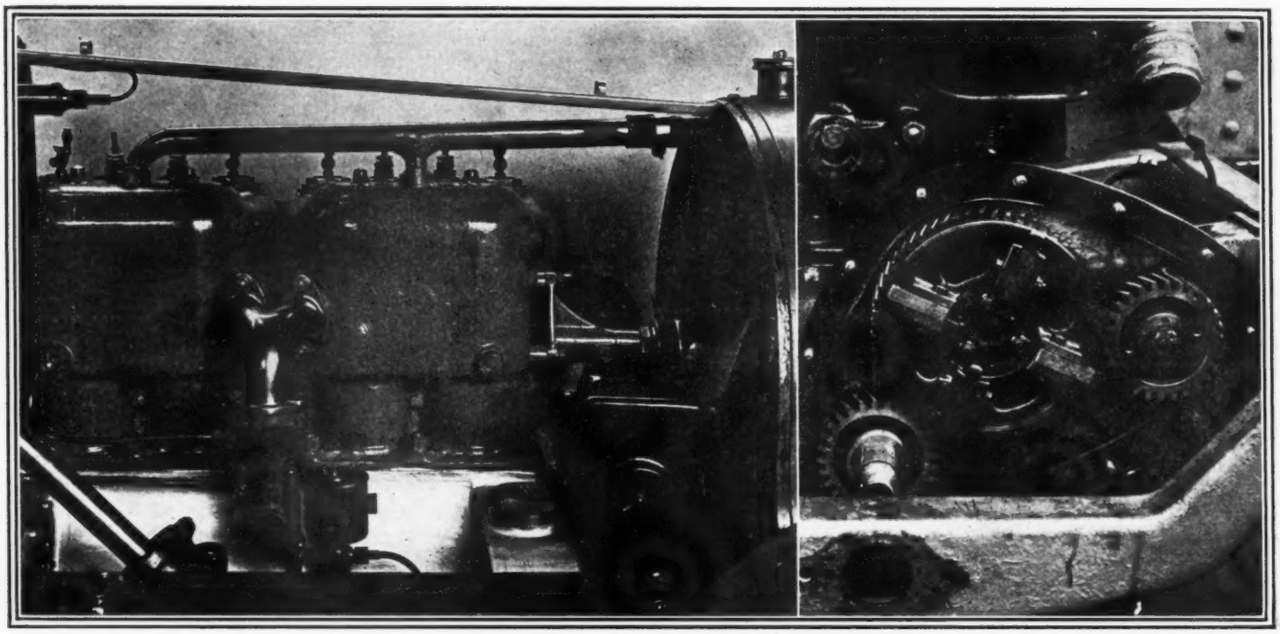


Section of Darracq worm-driven axle with underneath worm



Cast-steel gearbox on the new Darracq, showing extending arms for carrying the gearbox brake

Assembly of Darracq worm-driven axle, showing ample space around worm for carrying of adequate oil supply



New Hotchkiss motor, with cross shaft, on one end of which is mounted the charging generator. The oil filler cap is on the front motor arm and the control for the oil level petcock on the rear arm. To the right is the spring pinion drive on the camshaft

large quantity of oil. There is a filler at the rear which also acts as level indicator.

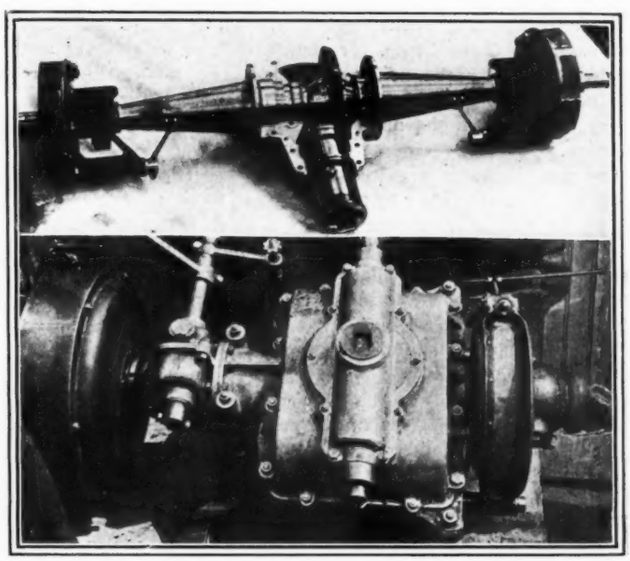
This suspension may be mentioned as an example of general European tendency. Rear springs have a width of 2.1 inches and a length of 51 inches. Both these dimensions have been increased since 1913.

Although electric lighting is a standard equipment, the car not being sold without this set, the self starter is made optional. It is of the C. A. V. type, the electric motor being mounted within the frame under the floor boards and starting the engine by a friction disk brought into contact with the face of the flywheel.

Detachable wood wheels are the standard equipment.

The new radiator is typical of European tendency. It is of the honeycomb type, all the angles being gently rounded off so as to avoid the rough break and harsh appearance present with the ordinary type of radiator and accentuated by reason of the sloping bonnet and easy rise into the scuttle dash. This rounding off of the radiator is common to all the best European cars, and is a detail refinement in the effort to avoid harshness.

The gasoline tank is in the dash. The filler has a glass top, and its diameter is sufficient to allow the hand to be passed into the tank. Although there is nothing of startling originality in the new Darracq, this car may be studied with interest as an embodiment of all the best European tendencies of the season. It should be remembered that this is a popular type, designed to sell at a reasonable figure, and ultra refinements are naturally barred out on commercial grounds.



Hotchkiss rear axle, in which the axle tubes are tapered steel forgings which bolt to the aluminum differential. Gearbox on Hotchkiss mounted on underswept frame pieces and having a housing protecting the universal coupling between the gearbox and clutch. This housing also permits of more constant and freer lubrication than is possible without it

Hotchkiss Confines to Four Cylinders

A lengthening of the piston stroke, improvements in cylinder casting, electric lighting as standard, improved lubrication, flexible camshaft pinion, improved brakes and springs, are among the more important of the changes on 1914 Hotchkiss. The firm is practically confining itself to fours; sixes are being made, but they are not shown at the Paris Salon.

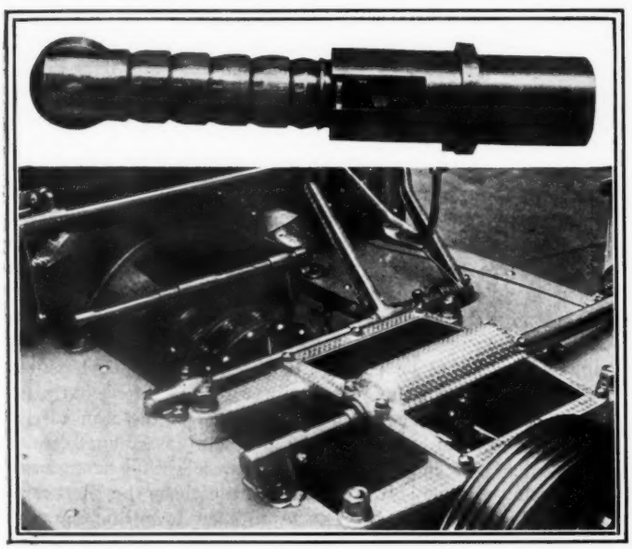
Changes in the cylinder casting comprise the abolition of the detachable water jacket plates used this year. They may have had the advantage of allowing scale to be cleaned out, but they were contrary to public taste. Advantage has been taken of the redesigning of the cylinder casting to give bigger passage for the exhaust and a straighter passage for the intake gases.

The 95 by 140 millimeter, 3.7 by 5.5-inch model is a block casting; the 110 by 150-millimeter, 4.3 by 5.9-inch model has cylinders in pairs, but set very close. In each case the intake manifold is integral and the exhaust separate and ribbed on front and top. Although the crankshaft has a central bearing, the crankcase is a single-piece casting with detachable end plates; the bottom plate merely serves as an oil retainer.

The forced-feed lubrication system introduced this year has been modified. The oscillating pump, driven off the crankshaft, delivers oil at one end of the crankshaft, forcing it right through to the connecting rods and to the central and front bearing. Next year's addition is a lead from the rear end of crankshaft to a tube along the outside and near the bottom of the crankcase, from which there are leads to the three main bearings. There is the same pressure of oil in this tube as in the hollow

crankshaft, and it serves to supplement the direct delivery of oil through the shaft. When new, or while the motor was in good condition, the original system was quite satisfactory; but as wear set up in the bearings oil leakage was apt to reduce the pressure to such an extent that the front bearing was apt to be starved. This addition serves to equalize the pressure.

The camshaft pinion is spring mounted. The inner, smaller-diameter part, mounted on the end of the camshaft, carries four sets of flat-blade springs fitting into notches on the larger-diameter portion on which the teeth are cut. The general arrangement is similar to the flexible coupling sometimes used for magneto drive. It is maintained that this spring mounting not only stops all chattering, but acts as an efficient damper against vibration. There is a somewhat similar arrangement on the universal joint between clutch and gearbox. A star piece is formed by two sets of blade springs, one set notching into the other and securely held by a couple of square coverplates and rivets. The spring ends are received respectively in the jaws of the driving and the driven members. The whole of this coupling and the clutch-withdrawing mechanism is contained within an oil-tight aluminum housing. The cone clutch is also inclosed. The encasing of the clutch-withdrawing meachanism was first introduced by Renault, and is a detail refinement which appears to be gaining ground.



Grooved valve lifter rods to aid lubrication on the Unic. Gearbox on Unic, showing flexible double-disk coupling between clutch and gearbox

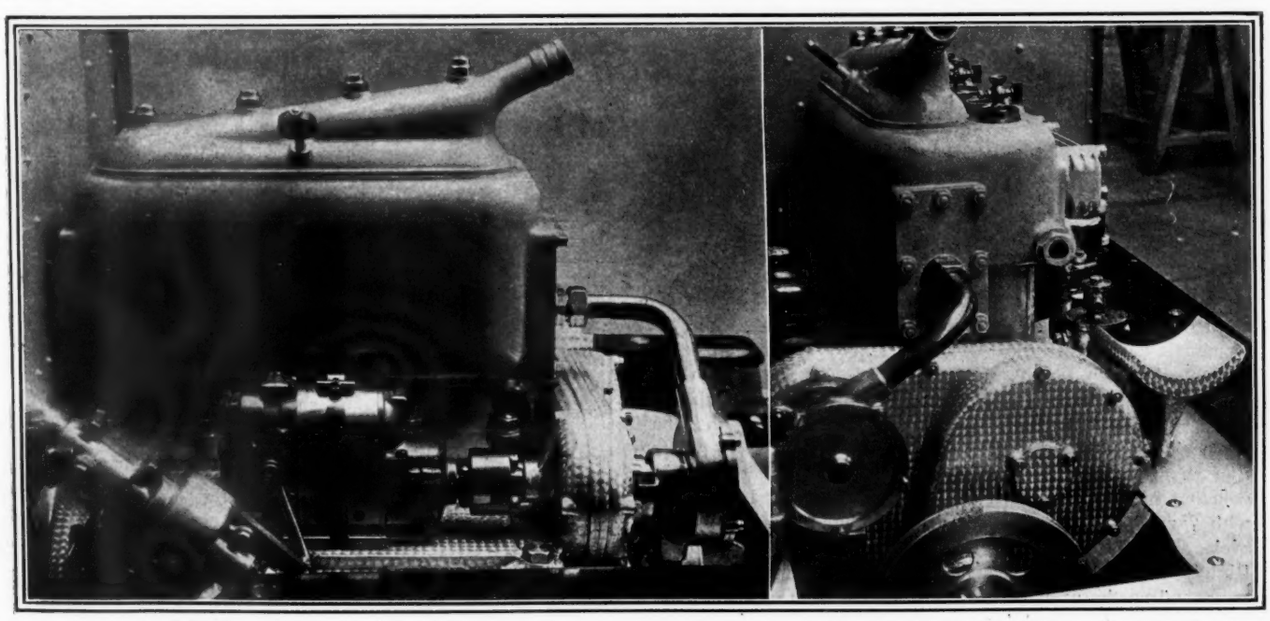
Hotchkiss now carries the gearbox on the top of a couple of underswept transverse frame members. The foot-brake has been increased in diameter and its face measures 3.5 inches. The shoes are external and ribbed. The equalizer for the rear brakes forms a bevel-gear differential in an aluminum housing. The adjustment is a very quick type, illustrated last week, and on the main brake rod there is a coil spring within a tube to prevent abrupt application of the brakes. Braking effort is not exercised until this spring is compressed. Drive and torque are taken care of through the springs. The number of leaves employed is generally fourteen.

Hotchkiss has produced a new rear axle built up of two forged steel taper tubes bolted to a central horizontally divided aluminum housing. This type of axle is becoming the most extensively adopted for the higher grade cars, although the differential housing is as often of cast steel as of aluminum. Hotchkiss has made use of very thick walls for the housing with a view to deadening the hum. The rear axle drive shafts are made taper in order to get a greater thickness of metal for the squared ends. The axle is of the full floating type.

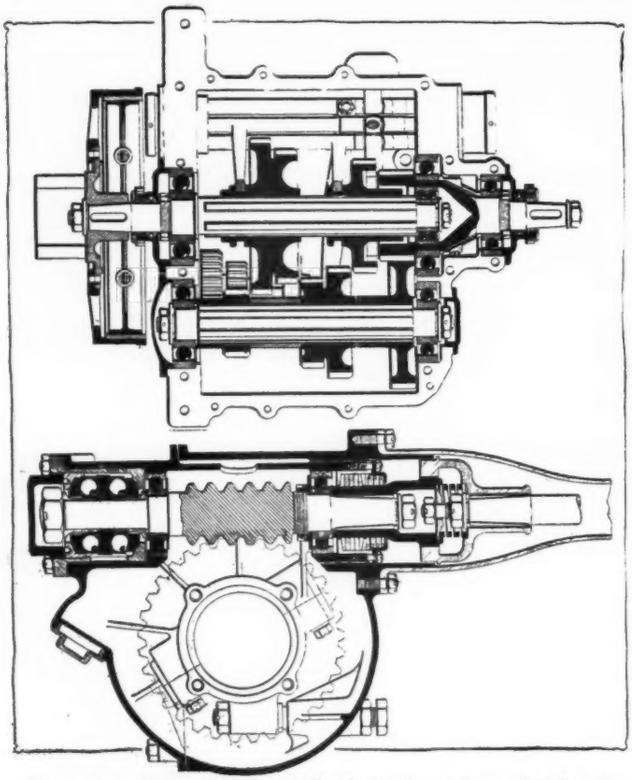
The electric lighting installation, which is fitted as standard, comprises a S. E. V. dynamo mounted across the front of the motor and driven by a cross-shaft working from the camshaft pinion; skew gearing is used.

Unic Uses Two-Bearing Shaft

Unic (Georges Richard) has produced a new four-cylinder model 80 by 130 millimeters, 3.1 by 5.1 inches. This firm's output consists almost entirely of four-cylinder types. There is a six-cylinder model on the catalogue, but it is more in evidence there than anywhere else. The new four is distinctive by having a two-bearing crankshaft. For motors of this size the majority of French designers seem to prefer a central bearing, but Unic, who has always shown a preference for two bearings only has got over the objections of vibration and whip by making the block unusually compact and fitting a main shaft of 1.96 inches diameter. The intake manifold is a part of the cylinder casting, with the carbureter on the valve side. The exhaust manifold is independent, and is ribbed, being bolted up so close to the



Unic motor, 80 by 130, fitted with Bosch variable advance magneto. To the right, the end view of the motor shows the platform on which the lighting dynamo is mounted, together with the accessible location of the water pump



Peugeot gearbox, showing splined shafts and careful bearing mountings. Peugeot worm-driven axle with worm carried on ball-bearings and fitted with double ball thrust

cylinder group as to give the impression of being part of the casting. Timing gears are chain driven, two chains being employed. One of these runs from mainshaft to camshaft, and the other from camshaft to shaft driving magneto and water pump. On the former there is no adjustment; on the latter adjustment is made by means of an idler pinion.

Lubrication is under pressure to seven points, main bearings, connecting rod bearings and chains. The dashboard forming part of the gasoline tank, contains a reserve oil tank. This can be fed into the motor by opening a lever on the dash, the oil passing through a filter and cock on the front of the dash to the crankcase by way of the breather tube. This cock also serves as drain off for the tank. Special provision is made for lubricating the valve tappets and valve stems. The tappets, which are of big diameter and carried in bronze guides, have a series of taper grooves cut on in such a way that they tend to suck up oil from the base chamber. The valve stem cover being practically oiltight, there is a constant fog of oil in this chamber.

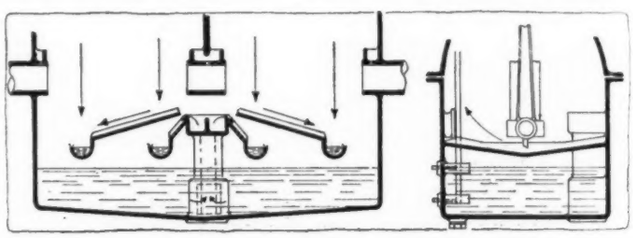
Electric lighting is practically a standard equipment. A hollow faced platform is bolted to the front left-hand side of the crankchamber in order to receive an S. E. V. dynamo. A pulley on the front of the crankshaft provides for belt drive to the dynamo. If the electric lighting outfit is not wanted the platform can be taken off by withdrawing two bolts, and the pulley dismounted. A year ago Unic introduced a patented leather coupling between clutch and gearbox of such a nature that it not only provided for the relative misalignment of the two shafts, but also for the fore-and-aft movement of the shaft when clutching and declutching. This has given such satisfaction that it has been adopted this year on all models. The coupling is a simple device consisting of a short hollow shaft with flanged ends, to each of which is bolted a deep stout ring of leather having its edges faced with a bolted-on metal ring. Rigidly mounted on the clutch shaft are a couple of flat-faced arms, and on the primary shaft a similar pair in opposite planes. The coupling is placed between these two pairs of arms and secured to them by a bolt passing through each. This subject of flexible connections between clutch and gearbox is receiving a lot of attention at the hands of French designers.

In common with most European makers, Unic has lengthened and broadened the springs. At the rear they are underslung and the upper portion of the spring is below the frame member. The rear spring brackets, receiving the ends of the forged taper axle tubes, are one piece with the brake guard and the housing for the brake lever spindle. The brake guard has its end lipped over the brake drum. This prevents dirt getting in, and at the same time forms a ring which will naturally collect any oil having leaked along the axle tubes, from which it can be ejected through a suitable hole. Being in one piece with the guard, the spindle carrying the rear brake lever is better protected against the infiltration of dust, for there is only one point, instead of three, at which it could possibly enter. Unic has made provision on this model for adjusting the driving pinion and the crown wheel without taking down the axle. This is not usually provided for on French cars.

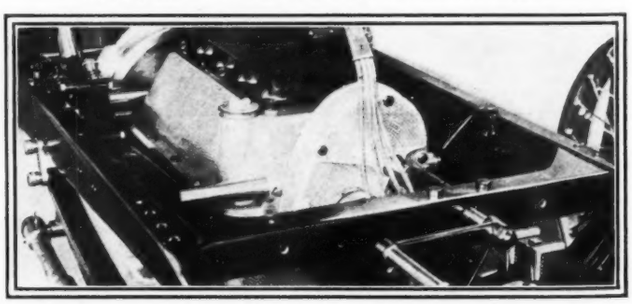
Charron Features Small Cars

Charron is a good example of the attention being given to small cars by European manfacturers. By a small car is meant a four-cylinder model of less than 2.5 inches bore, light in construction, and intended for runabout or general touring purposes. The new Charron cylinders measure 2.3 by 4.3 inches. Its motor is a single casting conforming in general to the usual Charron practice, but having, among other distinctive features, a special mounting on transverse tubes. These tubes, two in number, pass right through the front and the rear of the crankcase, and are secured to brackets on the frame members. The motor is free to slide on its tubes, and when centered it is locked in position by set screws. In order to take it out of the frame there are only two bolts on each hanger to withdraw, allowing motor and tubes to be lifted clear away. Single-handed it ought to be possible to lift a motor entirely out of the frame in 15 to 20 minutes. No sod pan is fitted, but sheet-metal guards are placed from side-members to the crankcase.

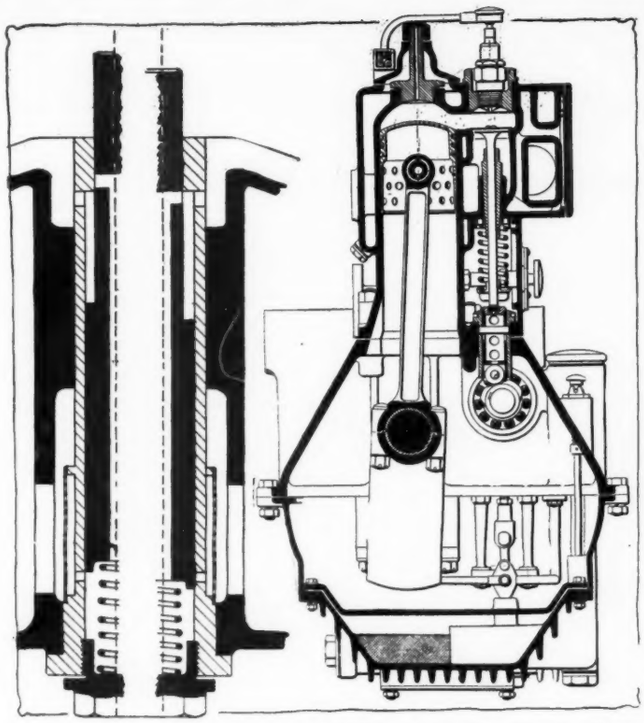
With a view to simplicity, the magneto is mounted on the front end of the crankshaft, and is just below the front transverse frame member. It is protected beneath by the sheet-metal casing, which is swept down so as to encircle it, and the front is covered by the license plate. By taking down one nut the license plate swings down, leaving the contact breaker of the magneto fully accessible. With this design there are but two



New system of oil troughs used on Charron models



Crankcase of 8-horsepower Charron light car, 60 by 110 millimeters, showing the starting crank fitted to the camshaft, the magneto driven from the crankshaft and the crankcase supported on transverse tubes



At the left, section through Charron oil pump. At the right, vertical section Peugeot 14-horsepower motor, 80 by 140 millimeters. Note perforated pistons

pinions in the motor, the crankshaft and the camshaft pinions, united by a silent chain. The starting handle passes through the front cross-frame member and engages with the end of the camshaft. Wiring is simplified, for it passes in a straight line from the magneto to the plugs. The clean-cut appearance is further enhanced by having the water inlet pipe behind the cylinder block going direct to the dashboard radiator, instead of running along one side of the casting, as is usual. The exhaust manifold is separate, but the carbureter is bolted up direct to the cylinder casting on the valve side. Valves have stems inclosed.

The gearbox has a similar mounting to that for the motor. It is of the three-speed, straight-through type, with two neutral points, one being between reverse and first, and another between second and third. This is done to allow the driver to pass direct into neutral, and also to get away on second under suitable circumstances without going right through the range of gear changes. There is nothing distinctive in the rear axle, which is full floating type with driveshaft in a torque tube. Both sets of brakes are side by side in the road wheels. Diameter of the drum is 12 inches, a big size for a car of this power and weight.

Charron has a somewhat similar model of 2.5 by 4.7 inches bore and stroke, and a medium car of 3.1 by 4.7 inches bore and stroke. This latter differs by reason of three-point suspension of motor—two rear arms carried on the frame members, and a trunnion in front. The motor has a three-bearing crankshaft, whereas the others have two bearings.

The magneto is set alongside the motor on a sliding platform allowing of chain adjustment. A single chain is used for driving cam and magneto shafts.

New Oiling Scheme

A change has been made in the lubrication system. A plunger pump driven by cam from the camshaft delivers oil to a collector within the crankchamber, from which it flows directly into constant level troughs immediately under the second and third connecting-rods. The oil splashed out of the central troughs is gathered on two long inclined oil leads cast on the inner wall of the crankchamber, and led by them to troughs under No. 1 and 4 connecting-rods There are similar oil collectors for the main bearings. Formerly a drip feed, interconnected with the throttle, was used.

When a dynamo is fitted the cover on the timing gear housing is changed for a special one carrying a pinion, obtaining its drive from the magneto shaft pinion. The dynamo platform is alongside the crankcase on the left-hand and is made to receive most of the makes on the European market. Similar arrangements are made for receiving an electric motor alongside the gearbox, with chain drive to the clutch shaft.

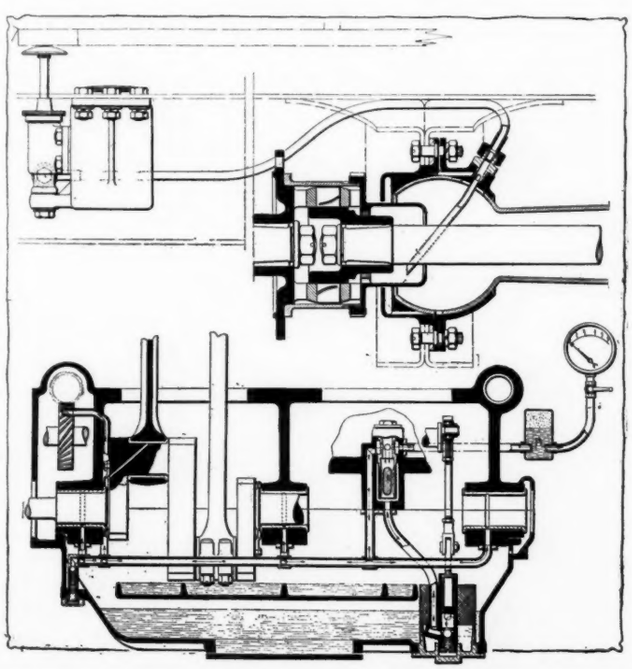
Charron completes the series with a four-cylinder block 3.3 by 5.9 inches bore and stroke, a four-cylinder in pairs of 4.3 by 5.9, and a six in three groups of 3.7 by 5.1.

Peugeot Adds 40-Horsepower Car

Peugeot is showing but one new model this year, a 40-horsepower car made with long and short chassis respectively for touring purposes and as a sporting type. It is a four-cylinder in pairs of 115 by 180 mm., 4.4 by 7.08 inches, bore and stroke. Only one model is made with worm drive; this is the 14-horsepower car with four cylinders of 80 by 140 millimeters, 3.1 by 5.5 inches. The Baby Peugeot, which may really be considered a cyclecar, is now made in two models, one having the original two speeds and reverse, and the other three speeds ahead.

The 40 horsepower is a remarkably clean-cut motor with twin castings set very close together, having external exhaust manifold and the carbureter on the side opposite to the valves. The magneto is on the valve side. The pump is driven from a cross shaft at the front, this shaft also being intended to drive a lighting dynamo.

On this, as on all the other Peugeot models the system of lubrication is by pressure to the main bearings and by means of troughs to the connecting rod ends. A four-speed gearbox is fitted, and final drive is by bevel gears, the drive being taken through the springs and a triangular torque member being fitted. On the sporting type unusually large diameter brakes have been fitted, both on the rear wheels and on the rear of gearbox. All drums are ribbed. The springs are broad semi-elliptics at the rear the frame member being given a pronounced kick up over the axle, which is carried on the top of the springs, then sweeping down at the rear.



Method used by Peugeot to lubricate universal joint. Diagram of Peugeot oiling system, showing internal pipes to crankcase bearings and splash level in addition

J. B. Dunlop, inventor of the pneumatic tire, photographed October 1, 1913, on his bicycle, built in 1889

Straight-Spoke Wire Wheel More Resilient Than Tangent Type

Pneumatic Tire Inventor Favors Wire Wheel With Straight and Tangent Types of Spokes

By J. B. Dunlop

DUBLIN, Ireland.—Editor THE AUTOMOBILE:—Recently in the columns of an English motor journal a suggestion was made that direct wire spokes should be employed in the front wheel of a motor or push bicycle and tangent spokes in the rear wheel, the idea being **that direct-spoke wheel is more elastic than a tangent and that tangent spokes are better adapted to resist the driving strain.**

Apropos of this argument, it may interest the readers of THE AUTOMOBILE to show herewith two reproductions of photographs of a racing bicycle built and fitted with pneumatic tires about the end of June, 1889. A well-known Dublin doctor asked me to lend him the bicycle to ride at the Trinity College sports about the middle of June, but the bicycle was not finished in time. James McCormick, after winning four races in Ireland, took the bicycle over to Liverpool and Bury and won the open races there.

Arthur Do Cros also borrowed the bicycle in September and easily won all the open races at Cork. He afterward took the bicycle over to London to compete for the Surrey cup, but safety bicycles were barred. The bicycle was ridden by my son on the road almost every day from the time it was built until the end of July, 1893, and the bicycle must have covered a distance of not less than 7,000 or 8,000 miles.

The air tubes today hold the air as well as they did the day the tires were made, and show no sign of wear. The canvas or fabric in the covers, which consist of a single layer at the tread, show no sign of wear whatever. The tires are of the double-tube variety, hard built, the air tube being a unit separate from the jacket or cover. The air tubes are a little over 1/64 inch in thickness and the tire is 1½ inches in diameter.

Straight Spokes in Front

The photographs were taken on October 1, and the bicycle is shown against a white background, in order to show the spokes clearly. The spokes, as may be seen in the photographs, are fine, and they are tangent behind, and direct in front wheel.

It will be seen by one of the photographs that the tires are well inflated and still quite capable of supporting a heavy rider. In one photograph the pedals have been removed in order to show the slots in the cranks which were in vogue when the machine was built. The steering center, if projected, would meet the ground in front of the central point where the front tire makes contact with the road. I provided the canvas and air tubes in length. It has often occurred to me that automobile wire wheels ought to have direct spokes outside and the usual tangent spokes inside. The wheels would be quite as strong and much neater and more easily cleaned.

Some years ago letters appeared in an English motor journal in which the several writers tried to explain the theory as to how the rim of a motor wheel was supported by a pneumatic tire. Obviously, the compressed air in the tire cannot support the rim directly because the air presses equally in all directions and therefore must press the rim as much downward as upward. Those who have given the matter a little attention understand that the rim is suspended by the tire practically in the same manner as the hub is suspended from the top of the rim in the ordinary suspension cycle wheel.

Relation of Weight and Tension

When weight is thrown on the wheel at the hub the tension on the spokes below the hub is reduced and tension of the other spokes is correspondingly increased. In a similar manner the threads or cords in the tire cover between the rim and the road are somewhat relaxed and the tension on all the other portion of the cover is slightly increased. The decreased tension on the portion of the cover between the rim and the road is due to the increased curvature or bulging at the sides of the tire. In other words, the portion of the cover in contact with the road becomes flattened and that between the rim and the road is bent to a curve of lesser radius.

It is well known that the tension in the walls of a tube containing fluid under pressure is in proportion to the radius of the tube, the pressure being the same. Not only is the tension of the cover reduced where it bulges at the sides, but the bulging causes the cover there to join the edges of the rim more in a horizontal direction and the tension or pull is

Bicycle built by J. B. Dunlop in Dublin, Ireland, in 1889 with straight type wire spokes in front wheel and tangent spokes in rear

therefore less effective to pull the rim downward or to counteract the upward pull of the cover at the top of the wheel.

Under ordinary conditions the tension on the cover, except where it bulges, would not be increased by more than 1 in 400 as compared with the tension on the cover when the wheel is lifted off the ground. The displacement of air is exceedingly small, therefore the air pressure cannot be much altered by lifting or lowering the wheel on to the ground. Of course, when the tire is in use the degree of the bulging and air pressure is constantly varying according to the roughness of the road and the speed of the car.

Compares Tires to Wire Wheels

When the cover of a tire is made of square cut fabrics the tire may be compared to a direct-spoke suspension wheel. Taking a side view, the spokes and the cross threads of the cover appear to extend radially in a straight line from the center of the hub to the tread of the tire. When the cover of a tire is made of fabric cut on the bias (diagonally) the tire may be compared to a tangent suspension wheel; the spokes of the wheel run in a tangential direction from the outer edge of the hub to the rim of the wheel and the threads or cords in the cover run tangentially from the rim to the periphery of the tire.

Direct Spoke Considered More Elastic

The direct-spoke wire wheel has always been considered more elastic than the tangent wheel because the negative force (reduced tension) which is transmitted directly from the road by a pneumatic tire to the rim is transmitted half around the rim to the top thereof and thence mainly through a very few spokes down to the hub; whereas, in the tangent wheel the force or shock is only transmitted from the road, one-quarter way around the rim and thence conveyed by a greater number of spokes to the under edges of the hub.

Having gone more into detail with reference to tires than I had intended, I shall defer the consideration of springs and shock absorbers for another issue, feeling sure that the automobile public will be interested in these subjects.

Much-Heralded New British Automobile Fuel Not Up to Par

R. W. A. Brewer, English Fuel Expert, States That Instead of Relieving the Fuel Situation, New Company Lightened Investors' Pockets

LONDON, ENG.—Editor THE AUTOMOBILE:—THE AUTOMOBILE for September 11, has unfortunately fallen into the trap which caught practically the whole of the British press, and it was some time before the public discovered through the medium of some of our automobile correspondents that the whole proposition was impossible and fallacious. It was an ill-timed statement on behalf of the Petrol Substitutes Joint Committee that coincided so closely with the statutory meeting of one company which has recently been formed, and is only now carrying on work in the experimental stage. Unfortunate I say, by reason of the fact that without in any way relieving or attempting to relieve the fuel situation in England, it has on the other hand relieved the pockets of unwary investors to a very considerable extent. For example, so soon as the pronouncements were made, the shares of the said company went to a premium of over $10 and a quiet tip was given that this price would go up to $25 very shortly.

Other Similar Operations

Without wishing to mention any particular parties connected with the financial side of the motor spirit concern, one cannot help remembering other operations which have been carried out on somewhat similar lines by the said parties, and it would seem therefore that the untimely pronouncement of the secretary of the Petrol Substitutes Joint Committee served to stimulate the public ardour to participate in the lucrative business of motor fuel supply.

Whether it would be possible to carry out the process on a commercial scale, or even to procure what was to that process the raw material a substance hitherto unsuitable for motor fuel and a practically valueless by-product obtainable in unlimited quantities apparently did not concern the general public.

Bubble Has Been Pricked

The bubble has now been pricked, for upon careful study it has been shown that even taking the figures given by the proprietors of the process referred to, of 43 per cent. as the total yield of refined spirit from the raw material, it is evident that 93,000,000 gallons of heavy oil must be obtained, and if this is procured from the distillation of coal tar 465,000,000 gallons of coal tar would be required, which is over 50 per cent. in excess of the total of the coal tar produced in Great Britain per annum.

Reverting to the tar situation, we will briefly consider whether it is possible to sell such a fuel at the price quoted, of 28 cents a gallon:—taking as our base the price of the heavy tar oil as 7 cents per gallon at the tar works, and adding to this 2 cents for transport and handling, adding also 1 cent per gallon for the cost of the process, 4 cents for distribution, a retailer's profit of 4 cents, which is the standard of profit in England, and a government tax of 6 cents, we find that putting this cost figure onto raw material which is 230 per cent. of the total refined product, and the other figures on to the refined product, the cost per gallon comes out at 37 cents per gallon, that is, without making any allowances for capital charges, interest, depreciation of plant, general exploitation and profit. I am therefore seriously afraid that so long as the government tax remains and our present system of distribution in 2-gallon packages, the artificial, or superficial charges, which go to mount up the price of fuel will always be a serious impediment to the provision of a cheap fuel in England.—ROBERT W. A. BREWER.

Tinker's Notions Hold Back German Trade

Frequently German writers voice a plaintive wonderment at the fact that the sale of automobiles in Germany is only one-third as large per capita as in England, only one-half as large as in France. According to recent statistics the national wealth per capita in Germany now exceeds that of either of the other two countries, and this makes the lukewarm adoption of the automobile so much more difficult to explain. Perhaps there is not so much of sassy young joy in living among the *"Verboten"* signs of the Fatherland as in the other nations, but probably there is also another cause at work. Nearly every issue of German automobile journals gives the automobile industry a black eye or at least a smart dig in the ribs by devoting an extraordinary amount of space to a scatterbrained hodge-podge on troubles, makeshifts and amateur repairs—in sharp conflict with the serious and intelligent efforts of the German industry for catching up with America in providing forms of manufacture by which wear is localized in replaceable parts, breakage obviated and spare parts are placed widely at the disposal of car owners.

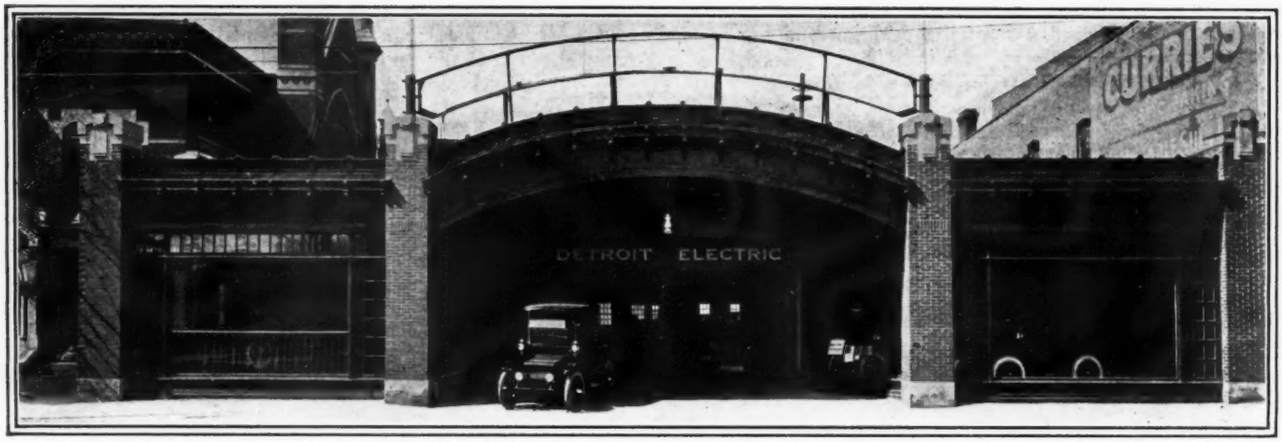


Fig. 1—Entrance to the main service station of the Detroit Electric fronting on Woodward avenue, Detroit, Mich.

Detroit Service Stations Handle 170 Electrics a Night

Three Establishments Maintained by Anderson Electric Car Co. in the Automobile Capital Insure Homes for Its Cars Where They Will Receive Efficient Care

THE Detroit Electric which is cared for in any of the three service stations maintained in the automobile city by the Anderson Electric Car Co. is truly a car with a home. One hundred and seventy electric passenger cars are cared for each night in these electric garages. The main service station and the largest of the three is located on Woodward avenue, Detroit's main thoroughfare. This is known as station "A" and here the main offices of the three are located. This garage takes care of about 100 cars per night; Stations B and C are located in other parts of the city and care for forty-five and twenty-five cars respectively, on the average. Each is in charge of a superintendent who is answerable to the manager at station A. We will therefore confine ourselves to a consideration of this main station, since the workings of the other two are essentially the same.

Here all accounts are kept, all bookkeeping done and all important repairs made. Body work, and large repair jobs are done at the factory. Of course, when station A is crowded with repair work, the factory helps; it also helps out on general repairs.

Floorspace of 24,660 Square Feet

This main Detroit electric garage measures approximately 192 feet in depth and has a width of 90 feet. This entire space is devoted to garaging of cars with the exception of the front end which is given over to offices and show room, these being on either side of the entrance driveway. No repairs are made on this floor although the cars are washed and charged here. The second floor which measures 82 by 90 feet is given over to repairs, to a battery room and to a stockroom. The cars are brought to it by means of an elevator at the rear end.

On the first floor there are fifty-six charging plugs, while the second has ten. Since direct current is available, resistance rheostats only are necessary. They are not arranged individually, one at each plug, but are grouped alongside of a panel which controls the group. From it, the wires are led out to the plugs arranged equidistantly. At each plug there is a loose connection so that a long or short wire may be used according to where the particular car to be charged is standing. Along the south side there are four panels, while the north has three. The charging apparatus is of the Cutler-Hammer make.

At the rear and at the right of the elevator is the main panel on which are the switches controlling the electric mains entering the garage, the circuit breakers, the recording kilowatt meter and the two recording ammeters, one reading for the current supplied to each side of the long main floor. Twelve-hour records are made by these instruments, making it possible to determine current consumption at any time for figuring costs. The switches permit the cutting out of either side of the house, and the circuit breaker acts at 1,000 amperes.

At the rear there is also a motor-driven air pump for maintaining air in a storage tank at a pressure of 100 to 120 pounds. An automatic switch sets the motor to driving the pump whenever the air pressure gets below 100 pounds.

CHARGING CARD

Owner J. C. Smith Date OCT 9 1913
Make of Car Detroit License No. 3163
40 Cell Edda Battery

Unit	P. M. Volts	P. M. Amperes	P. M. Temp	A. M. Volts	A. M. Amperes	A. M. Temp	Unit
1				110	25	100	1
2				110	25	100	2
3				110	25	100	3
4				110	24	100	4
5				110	20	100	5
6				110	12	100	6
7							7
8							8
9							9
10							10
11							11
12							12

	P. M.	A. M.		
Car In		12:30	Miles Today	48
Washed		1.50	Miles Last	36
On Charge		2:00	Instal Spc. Gr.	1190
Off Charge		8:00	Final Spc. Gr.	1280

REMARKS.

Station No. A Attendant J. B. Crase

Fig. 2—Charging card used in Detroit Electric service stations to give the battery man an idea of the condition of the cells

Expert Battery Department

Upstairs in the battery room every facility is afforded for the maintenance and care of lead storage batteries. In charge of an expert battery man, this department is able to build up batteries, wash them or give them any attention which they may require. Here is a special charging board which is capable of very close regulation for the charging of an individual cell or a complete battery. Other apparatus which might be mentioned is the acid tank for mixing of the electrolyte, the tank for holding the wood separators which is lined with lead, the washing-out tank for cleaning jars and trays

also lined with lead, the hydrogen generator for burning the battery connectors into place, the casting furnace for making the lead cross link connectors, the tank for making the tar and asphultum sealing compound with which the jar covers are sealed on. There are of course the benches and battery trucks which are very necessary equipment. Another device which is very handy and the idea of the battery man is a regulation iron letter press which is put to the new use of pressing the negative plates into shape when they are spongy.

Strict Record Is Kept

When a patron is through with his car for the night, he telephones the garage to come for it. This order is then entered upon an order book on the page headed "Automobiles Returned," Fig. 3. The first or second column is checked according to whether it is a. m. or p. m., and in the next column the time the order is received is noted, following which the time the car is to be returned is marked down. Next the time the man was sent for the car is noted; when the car gets back is also recorded.

In order to get the car, the "chaser"—as the men who call for and deliver the cars are known in the vernacular of the electric garage—must have keys to the door and the controller and these he gets from the customer's hook on the keyboard. Obviously it is all important that these be returned to their place after the car is delivered or called for, and to make sure of this they are checked in and out. The record also indicates the mileage which the car has made during the time it was out. This is an important item and serves as a check on the battery performance.

After the car has been checked in as seen above, its windows are put up so that they may be washed. A charging card is then made out, Fig. 2. On this are noted the miles made today and the day previous. This gives the battery man an idea of the condition of the battery. The card is also identified with the car by noting the car number, owner's name and so on. If there is anything to be repaired, the chaser reports it to the man on the car record book who makes out a work order.

The charging card is then put in the car after which it is driven to the top washing rack. Here there are hooks for the suspending of four pails of water from the ceiling. The washer gets up on a ladder and washes off the roof of the vehicle using the water in these pails. At the same time all dust within is blown out by the compressed air. The car is now ready for its washing proper.

It is here that special care must be taken, for of all vehicles the electric must look bright and polished at all times. The Detroit garage does not recommend washing every night unless desired by the owner and the car really needs it.

At the Detroit electric garage, one washer and one polisher work together. Together they can handle forty cars a night unless it has been a very muddy day. Four strong lights are hung at the corners of the wash rack so as to show up all dirt on the cars. Another kink of the washing here is to warm the water in the winter months. This aids in the quicker removal of the dirt.

The car being washed and then polished by the man with the chamois, it is then ready for its night's charging. One of the two cleaners goes for the next car in line while the other drives the finished machine to the point where it is taken in hand by the charging man. Thus no time is wasted.

The charger next takes the car and puts it on charge, having noted the mileage as marked on the charging card, Fig. 2. He is required to read the voltmeter and ammeter every hour during the charge and to note them on the card. With the average lead battery, the amperage at the start is between 25 and 28, this being cut down to about 12 amperes for the last hour or hour and a half. Edison batteries do not receive this tapering charge, but are held to a flat rate. For instance an A-6 cell battery is charged at 45 amperes, while an A-4 is held to 30 amperes.

Day Crew Does Most Delivering

At 7.00 a. m. the day crew comes on and it usually devolves upon them to deliver most of the cars. The night watchman or charger leaves a report for the day superintendent of all cars left on charge, and unless called for these remain on charge until their batteries are full. For in general the damage is done to the battery by undercharge rather than overcharge.

From the record book on the page marked "Automobiles Taken Out" the day men get their instructions as to what cars are to go out and when. The same time notation and key

AUTOMOBILES RETURNED

A. M.	P. M.	Message Received	Wanted Returned	Man Sent	Car Returned	Returned By	Car Fare	KEY Out	KEY In	WHERE TAKEN FROM	Odometer Out	Odometer In	Difference	REMARKS
	✓	11.30	12:00	11:35	12.75	Stew	.05	✓	✓	21 Davenport St	1738	1766	28	

Fig. 3—Heading of page on which orders are entered for the return of the car to the station as they are received over the telephone from the owner

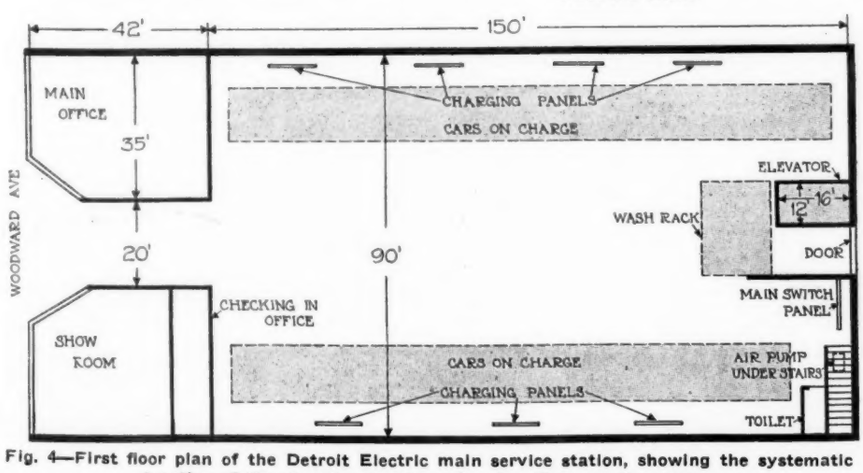


Fig. 4—First floor plan of the Detroit Electric main service station, showing the systematic location of the charging panels and main office and show room

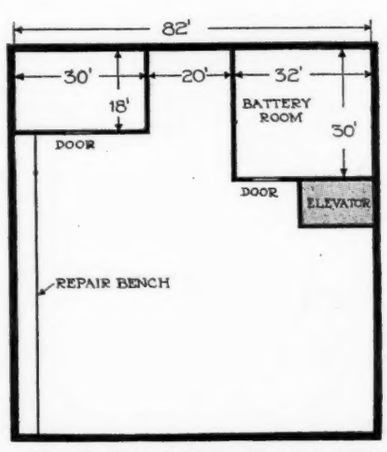


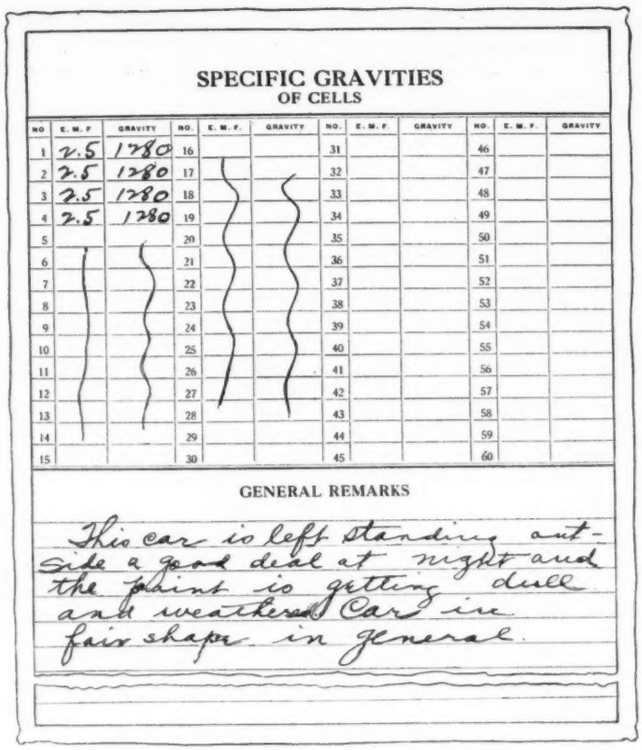
Fig. 5—Second floor, showing repair shop and battery room

checking are required on this page as we have seen for cars returned, Fig. 3. Before the car leaves, the chaser must see that the battery decks are locked, he must try all of the lights, give the windows and the nickel trimmings a final rubbing if they need it, dust out the interior and polish the body if necessary.

Car Is Inspected

His car must pass inspection which is personally done by the superintendent. This done, the chaser dons a pair of white gloves so that any grease or perspiration on his hands will not dirty the controller and steering levers, and drives the car to the owner. Arriving there, he wipes off the handles, locks the car and returns to the garage where he must check in for time and return of keys.

Another interesting feature of the service in addition to the use of white gloves is that slip linings of unbleached cotton are kept over light upholsteries to prevent soiling by the garage men and chasers.


SPECIFIC GRAVITIES
OF CELLS

NO.	E. M. F.	GRAVITY	NO.	E. M. F.	GRAVITY	NO.	E. M. F.	GRAVITY	NO.	E. M. F.	GRAVITY
1	2.5	1780	16			31			46		
2	2.5	1780	17			32			47		
3	2.5	1780	18			33			48		
4	2.5	1780	19			34			49		
5			20			35			50		
6			21			36			51		
7			22			37			52		
8			23			38			53		
9			24			39			54		
10			25			40			55		
11			26			41			56		
12			27			42			57		
13			28			43			58		
14			29			44			59		
15			30			45			60		

GENERAL REMARKS

This car is left standing outside a good deal at night and the paint is getting dull and weathered. Car in fair shape in general.

Fig. 6—Complete record of the battery of each car is noted as above on the reverse side of the inspection report. This is for the information of the manager

Once a week, each owner is required to leave his car at the garage for about half a day for battery care.

The complete schedule of prices in vogue at station A is given on the rate card below:

DETROIT ELECTRIC GARAGE
ELECTRIC GARAGE RATES ON DIRECT CURRENT LINE
STATION "A"
Rates in Effect March 15th, 1913

Full service on car line	$40.00	per month
Full service in four block zone where no carfare is used	37.00	per month
Full service less delivery	32.00	per month
Live storage	14.00	per month
Dead storage where battery has been dried out	10.00	per month
Battery care twice per month—no delivery or wash	5.00	per month
Individual inspection—no delivery or wash	2.50	per month
Battery and repair work	.75	per hour
Single washing	1.25	
Single charging	2.00	
Single delivery	.25	
Single call	.25	
Driving	.60	per hour

Service at stations B and C is slightly higher since direct current is not available and there is a slight loss in the necessary transformation from AC to DC.

The Detroit station A keeps five men busy in the day time and four at night calling for and delivering cars. Of course, they not only deliver cars but do the finer cleaning as we have seen. They are employed on a salary and bonus plan which has been found to work out very satisfactorily. Some of them get $40 and some $45 per month. Providing a man obeys all garage rules and there are no complaints against the cars which he delivers, he gets a bonus of $5 payable each two weeks. If he loses his bonus three times, he loses his position also.

Inspection Reported

A very important feature of the Detroit electric service in the city of Detroit is the periodical inspection of every car of this make in the city. An inspection report is the result of the visit of an inspector who does nothing else. These reports are turned in direct to the manager of the service stations. On the report must be noted the condition of the various parts and it serves as a general guide to the condition of the vehicle. If possible the inspector gets a statement from the owner. In the case shown, this statement is a tip to the head of the garage that the owner is a prospect for a new car.

On the reverse side of this inspection report a complete record, Fig. 6, of the battery is noted for the information of the manager. Here also is space for general remarks on the conditions as the inspector finds them. Based on this report the manager writes the car owner advising that the various parts found out of order be repaired. If the defect happens to be anything that comes under the manufacturer's guarantee, the owner is requested to bring the car in to the garage, when such defects will be remedied free of charge.

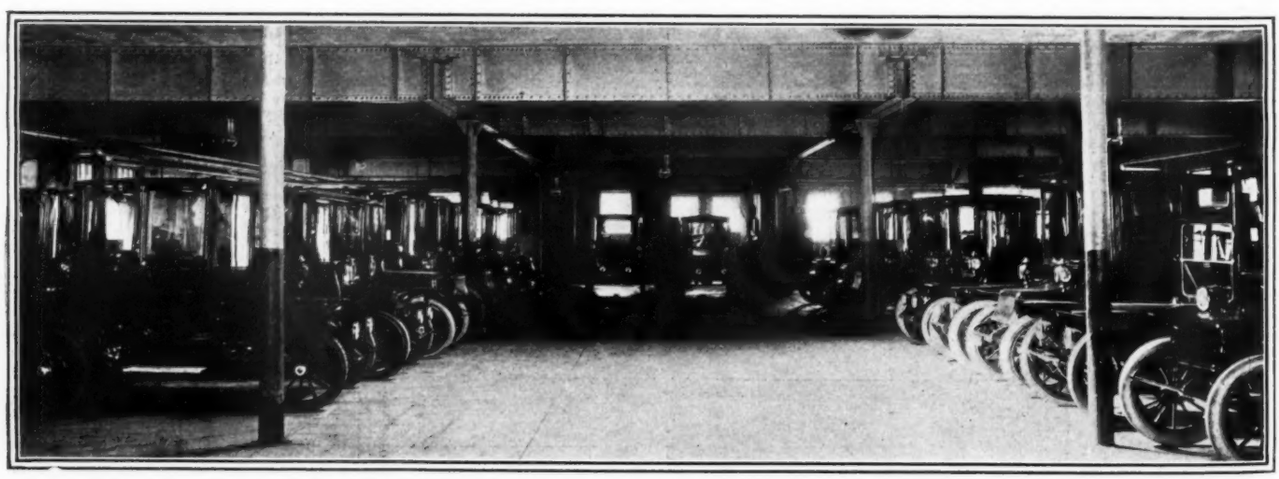
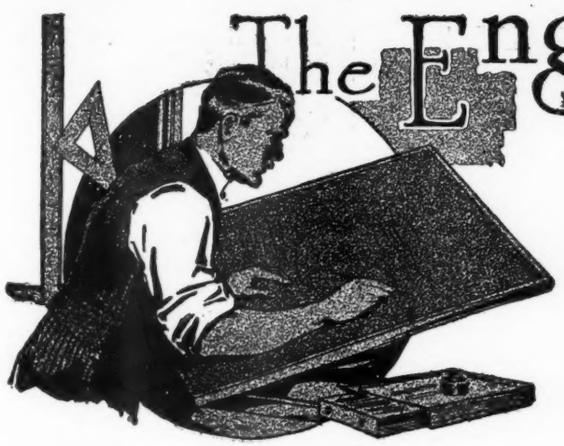


Fig. 7—Interior view of the ground floor of the main Detroit Electric service station from a photograph taken at night. The cars are shown on the charging stands

The Engineers' Forum



Pneumatic or Electric Gearshift?

Mechanical Engineer Believes That Designers Are Being Carried Away by the Continual Demand for Electric Apparatus

PLANO, ILL.—Editor THE AUTOMOBILE:—I have read with no small amount of interest articles which have appeared in these columns from time to time regarding various methods suggested and discussed for shifting automobile transmission gears by other than the conventional hand lever method. but I wish more particularly to note various points brought out in the recent editorial under the title, The Eventual Gearshifter, as it appears to have been inspired by the thought that "People are thinking electrically." People today are not only thinking electrically, they are doing electrically many kinds and varieties of work that, until recently, was done by manual labor. But even electricity has its limitations, limitations not so much perhaps in ability to accomplish as in adaptability of application. A great many machines are designed for various purposes and discarded, simply because they are too complicated. This, of course, applies as well to those operated by other than electrical energy, but it appears as though designers and inventors are being carried forward by the inertia of the continual demand for electrically operated machines and mechanisms and too often electricity is used for the motive force when some of the older known sources of energy would be not only simpler, but more efficient.

Air More Dependable

The editorial referred to gives an excellent illustration of this and I trust I will be pardoned if I carry the thought a step farther, as I believe the average layman would be somewhat misled in reading this article if he thought only of this one application of electrical energy. The principal reason, I believe, for the use of electricity in operating railroad switches is that it is not only positive in action when working under proper conditions, but that it can be easily conducted from place to place without appreciable leakage, and it is readily stored and controlled, providing suitable and necessary room can be provided for its generation, storage and transmission as the required apparatus is not only heavy, but bulky in its proportions and only suited for use where good foundations in solid earth are possible. The results obtained probably justify the conclusion of 100 per cent. efficiency for this class of service.

Let us now turn to that other well known example of railroad efficiency equipment, the air brake. Here we have another source of energy used for a purpose of even greater importance than switch operation. Greater because of the too-often necessary emergency applications due to impaired tracks or trespassing obstacles which not only demand positive action 100 times out of every 100, but positive action in the shortest space of time. Should the apparatus used to mechanically operate a switch get out of order it is comparatively easy to operate the switch by hand with only the inconvenience of temporary delay without attendant danger to freight or human life, but who would care to ride on a modern flyer if there were the remotest possibility of having to resort to hand brakes if a washout was within sight ahead?

Pneumatic Shifter Simpler

There are many other uses to which compressed air can be put with advantage, including rock drills, mine locomotives, hoists and the well-known pneumatic tube system for carrying small packages. Certainly, electricity is also used for the same character of work, but when the safety of valuable freight and precious lives depends upon the absolute control of the trains upon which they are carried, air is used exclusively.

The eventual gear shifter must be as positive as the air brake so as to be safe, light in weight to avoid additional loading and, also, it must be simple enough for the average layman and garage mechanic to understand and repair.

I believe the pneumatic system could be made to meet any and all of these requirements, as it is possible for the driver to anticipate and select the desired speed by means of a lever on the steering column and then to quietly, positively and quickly shift the gears by means of a small piston actuated by air under pressure in a cylinder. If there is an electrical shifter that could be made as simple and positive as this, I have never seen it, nor do I think it possible to build one.

Car owners and users are becoming educated against anything that complicates the car and garage men will agree with me when I mention the trouble experienced in getting men who can make repairs on electrical apparatus, for repairs must needs come where elaborate wiring, insulation, generating sets, motors, storage batteries, switches and solnoids are used in apparatus to shift the gears. Therefore, I believe the eventual gearshifter to be of the pneumatic type.—S. R. HUNTER, Mechanical Engineer.

Using Mirror Instead of Turning Lamp

Rather than complicating headlights with a swinging bracket for the purpose of being able to turn the light to one side or the other at bends in the road, or when it is desirable to see something standing back from the roadside, *The Autocar* recommends to mount a two-faced mirror edgewise and pivotally in front of the lamp so that it receives light rays from both sides. By turning this mirror, by a Bowden wire, for example, the same purpose can be served as by turning the whole lamp, and one-half of the light is not deflected but continues to illuminate the road or roadside straight ahead. In connection with the neat built-in lamps the suggestion is of course, especially pertinent though not yet worked out in detail.

The idea of bracketing head lamps is one that looks feasible on paper but in actual practice meets with difficulties owing to the weight of the lamps and the constant vibration of the car. The swiveling mirror being much lighter is free from this objection. The wire necessary to operate such a mirror would also be much lighter and the action of turning produced more easily.

Rushmore Starter Requires No Intermediate Gears

Pinion on Sliding Armature Meshes Directly With Toothed Flywheel

A NEW model Rushmore starting motor has just been introduced, which operates on the same principle as previous models but is of much smaller and more compact construction. It is a series wound machine with a plain cylindrical casing, Fig. 1, and measures only 5 inches in diameter. It is designed for mounting alongside the flywheel either above or below so that the pinion on the end of the armature shaft meshes direct with teeth cut on the periphery of the flywheel. The method of bracketing on the crankcase of the Simplex is shown in Fig. 3.

The Rushmore principle of sliding armature and gear meshing will be made clear by reference to the section, Fig. 2. It will be seen that the armature, when the pinion is in the "off" position, is considerably displaced, that is, its magnetic center C does not coincide with that of the field magnet poles F. The armature is held in this position by the action of the spring S contained within the hollow shaft and bearing at the outer end against a screwed cap on the bearing.

When current is applied, the magnetic attraction of the fields draws the armature up into the poles and with it the pinion P, which meshes with the teeth on the periphery of the flywheel and proceeds to "crank" the engine. As soon as the engine picks up, the armature is returned by the spring S to the position illustrated, with the teeth out of engagement. This is the broad principle of the starting operation.

The starting switch, shown in Fig. 4, is of the pedal type and is situated under the floor board with the plunger P projecting above. There are three contacts on this switch, which is of the radial type, and the switch arm S pivoted at A is made to move over them by pressing on the plunger against a strong spring contained in the switch casing. A short length of Nichrome resistance metal R bridges the two lower contacts 2 and 3, and the cables lead to battery and motor as indicated in the diagram.

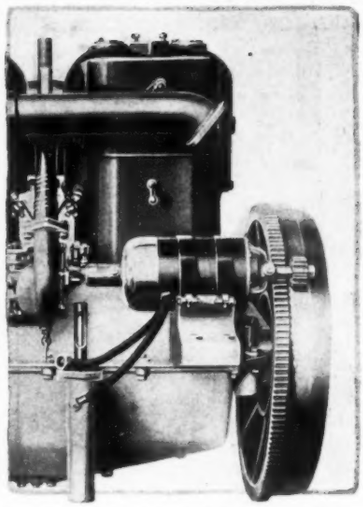


Fig. 3—Method of fitting Rushmore cranking motor to Simplex engine

The connections are such that this resistance is in circuit during the first part of the stroke of the pedal while the armature is drawing the pinion into mesh but is cut out on the third contact allowing the full current to flow in series through the field coils and the armature winding. This is accomplished as shown in the diagram of connections, Fig. 4, as follows: Besides the ordinary main leads from the motor, one connected to the fields and the other to the brushes, there is a third wire T, which acts as a short across the armature, and on the switch arm in its first position bridging the contacts 1 and 2, the current flowing from the positive terminal of the battery to contact 3. passes along this third wire, after traversing the resistance R. This practically short-circuits the armature and allows it to be drawn by the strongly magnetized fields, with scarcely any effort at rotation until the teeth are in mesh. By this time the second and third contacts having been bridged and contact 1 left free, the armature at once speeds up and the full torque is applied.

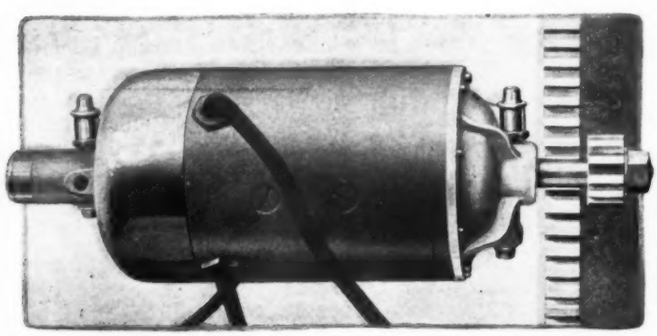


Fig. 1—External view of Rushmore starting motor

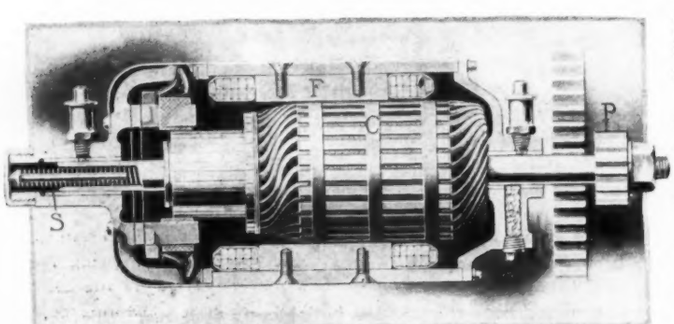


Fig. 2—Section showing displacement of armature when pinion is out of mesh with flywheel

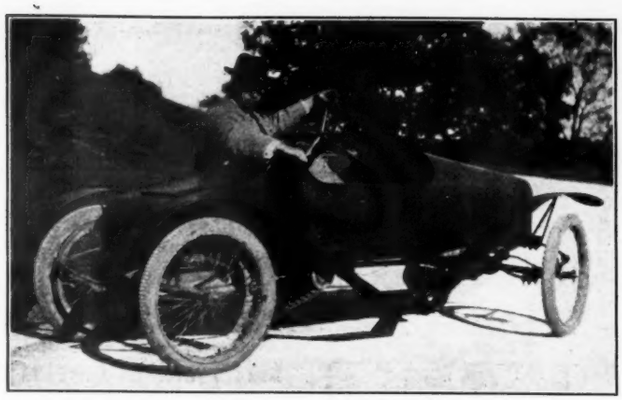
Motor Releases Itself.

The motor is so designed in relation to the spring inside the shaft that unless it is exerting considerable torque the current drawn is insufficient to hold the armature up in the field. This provides for the circumstance of the switch being held down after the engine has started. The motor at once releases itself as soon as the engine fires and will continue spinning idly out of mesh until the pedal is released. On the return stroke of the switch arm a simple ride-over device in the path of the switch arm causes the second contact to be cleared, thus reaching the "off" position direct from the third contact, effectually preventing any hitting of the gears.

Constructionally, the motor is remarkable for its compactness. The poles are only .5 inch long and the flat field coils take up practically all the annular space between the armature and the inside of the field ring. Square wire is used both for the field and armature winding.

The end covers are aluminum castings containing bronze bushings for the shaft. Lubrication is provided for by a pair of oil cups, and there is in addition on the main bearing a chamber filled with a pad of oil-soaked felt which bears against the shaft. Four copper gauze brushes are used.

The characteristics of the new motor, obtained from actual test, are shown in the curves, Fig. 5. It will be seen that the stalling torque is nearly 28-foot pounds at which time the motor is taking 500 amperes and the voltage of the battery has dropped to 4.13. The very high efficiency, for a motor of this size, of 75 is reached when the speed is around the 1,000 mark, and shows up well even on lower speeds.



Zip belt-driven cyclecar fitted with air-cooled engine

Zip Cyclecar Severely Tested

Makes 51-Mile Trip Over Bad Roads—Front Axle Only Trouble

THE Zip cyclecar, made in Davenport, Ia., made a trip from that city to Iowa City, a distance of 51 miles in 2 days, recently, traveling over roads frozen into almost impassable ruts after a 3-days' rain, and yet riding in comfort and with reliability. Steep hills with abominable surfaces were climbed without difficulty and, in short, the side-by-side seating type of cyclecar lived up to its first opportunity in America to publicly show what it could do in the way of really hard going. No attempt was made to make time, however, as the car, while waiting for delivery of the standard type of axle to be used later, was fitted with a temporary front axle from on Orient buckboard which was not up to the work. This axle and the steering gear connected was the only part giving any trouble on the whole trip. The motor, a Mack V-type, air-cooled, gave no trouble at all and pulled all the hills with ease. The trip was observed by a staff correspondent of THE AUTOMOBILE.

The start was made from Davenport at 8:45 a. m. The road, soaked after the rain, was full of ruts, slippery with mud, and full of holes. The car, a belt-friction drive, seemed to run over this surface without any trouble, free from skidding or need of chains, and, while the axles and wheels danced about like mad, they carried but little shock to the body. On the whole trip the springs bottomed but once.

Shows Hill-Climbing Capability

After climbing a long steep hill out of town in almost even competition with a big car the Zip settled down for the pull to the next town, Durant, some 20 miles away. The main difficulty was to pick the road, not for comfort, for this seemed to be almost irrespective of road surface so long as the bumps were not too deep, but to save throttling and as a result the steering gear came in for a lot of overtime, as the car swung to the one side or the other as the better surfaces ran. The speed was around 20 miles per hour, even on these surfaces.

A mile out of town the safety of the low-built type of cyclecar was demonstrated. The car was running at 25 miles per hour down a grade when the temporary axle gave out, the spindle breaking short off and the nose dropping to the ground, catching on the spring and sliding for 20 feet with but small shock to the riders. Lifting the car to the side of the road the axle was taken off, carried back to town and a few hours later the riders were back with a repaired axle.

After replacing the axle, a start was made for Wilton, 5 miles away. One stop was made between these two towns when the cable on the steering gear, proving to be but iron cable instead of piano wire cable, frayed out and refused to work. A half hour's work, and a piece of wire from a barbed-wire fence end completed a repair which held.

At Wilton a dog chain was bought from a country store and put in the place of the steering cable, the links first being flattened out to prevent stretch and the fastenings being taped so that the nuts holding the ends could not come loose. This repair worked well but allowed the steering wheels to yaw considerably. This hindered the speed so that night found the car at West Liberty, only 35 miles from the start. This all had been due to the defective front axle and steering cable. The regular front axle with rack-and-pinion steering which should have been on the car would have allowed a speed of 20 to 30 miles an hour.

The next morning a start was made for Iowa City, now but 17 miles away. A mile out on a down-grade, the temptation to let the car speed was a little too much, and, while going at about 18 miles an hour, the steering chain broke. The car went off the road, through a deep ditch, up the bank on the other side, and charged a barbed-wire fence. Nothing broke and the front springs did not even bottom as they struck the ditch diagonally. The steep angle of the bank also did not upset the car nor make it feel unstable, a surprise to a person used to a higher car. Another length of chain carried in the car fixed the steering gear after the machine itself had been lifted into the road again. Iowa City was finally reached at 11 a. m.

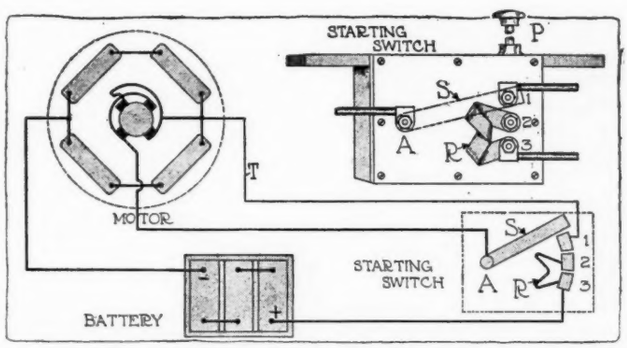


Fig. 4—Special starting switch and diagram of connections of Rushmore starting motor

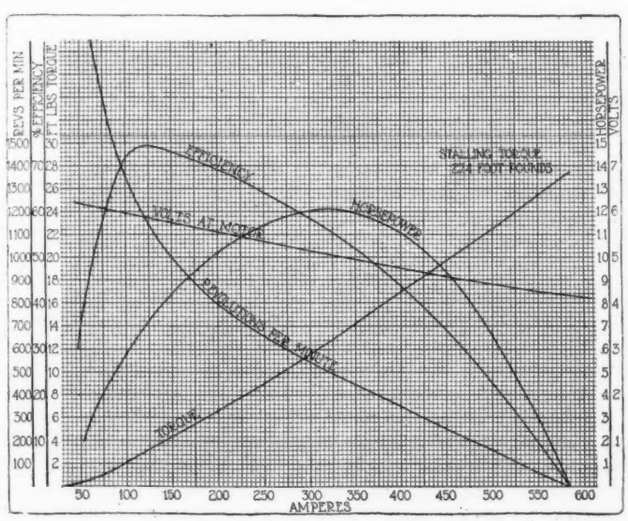
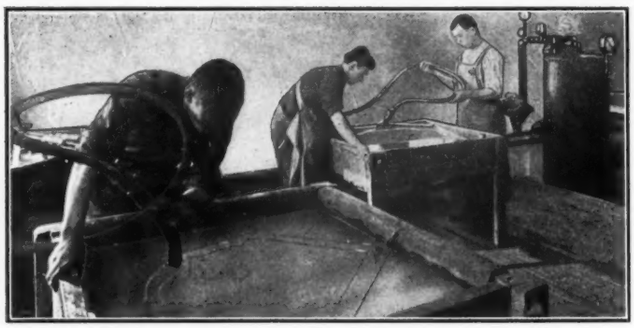


Fig. 5—Curves obtained from test of Rushmore cranking motor



The Rostrum

Clutch Drags

EDITOR THE AUTOMOBILE—1—The clutch on my Model L Westcott car does not release as it should when changing gears. How can this be remedied?

2—My Klaxon horn is not dependable. Sometimes it fails without any previous tampering with it whatever. What do you think could cause this?

E. M. BLACKSHER.

Brewton, Ala.

—1—Your clutch trouble is probably due to one of two causes, either the clutch linkage is worn so that the clutch is not entirely disengaged when the pedal is depressed or else the clutch brake does not work. Press the clutch pedal down as far as it will go and see if the clutch seems to drag when it is rotated by hand. If it does the clutch linkage is probably worn, or a new thrust bearing is needed. If, after tightening up the linkage and replacing any parts that are badly worn, you still have trouble in changing gears the chances are that the clutch brake is not working properly, in which case the clutch spider will spin for a long while after it is disengaged instead of coming quickly to a stop.

2—It is hard to say offhand exactly what the trouble is with your Klaxon horn, but we will suggest the places that may be causing trouble and describe how they should be fixed. First be sure that the batteries are giving their proper voltage. Then look over the wiring carefully and notice whether there is a loose connection anywhere or whether the insulation is worn away at any point allowing the wires to short-circuit on some part of the car. If the horn still refuses to work the probability is that the commutator needs cleaning as this is about the only place a Klaxon horn ever gives any trouble. To do this remove the lower cover E, Fig. 3, page 871, and wipe the commutator D with cotton waste saturated with gasoline, and spread a very thin film of vaseline or non-fluid oil over its surface. The makers recommend that the commutator be cleaned and oiled once a month and we think that if this is done you will have no further trouble with it.

False Gods?

EDITOR THE AUTOMOBILE—In this mad rush for touch-the-button starting the most important question of all appears to have been entirely overlooked.

Is it, on the whole, wise to handicap the average automobile with the great complication, first cost, cost of upkeep, extra weight and loss of power for the sake of starting from the seat?

Is there any real need of it, or is it only a fad?

It is not more convenient automobiles we really need, but more simple and reliable ones, that will do our work cheaper and not require so much attention.

The worst that can be said of the automobile of today is that it is too complicated and requires too much tinkering.

It is not the important parts of the modern automobile, which do the hard work, that cause the most trouble, but the small and often unimportant parts which may simply require adjusting, but they send the car to the repair man just the same.

While starting from the seat is very convenient, are we not paying far too high for it?

Must we have electric door-openers and electric windshield lifters next?

Are we running after false gods?

Just plain simplicity is the real foundation of the greatest automobile business on this earth. Isn't there food for real sober reflection there? "Where are we at?"

G. W. BROWN.

West Newberry, Mass.

Has Ignition Trouble

Editor THE AUTOMOBILE—I have an Elmore five-passenger touring car and am getting poor results from the ignition system. I think that the coil, which is of the vibrating type, needs sending to the factory for repairs, but I have an idea that I want to use some kind of coil with magneto, and possibly a storage battery. Then, again, I do not care to go to too much expense on fitting up this car, although the car otherwise is in good shape and gives me very little trouble other than the ignition.

Would like your advice as to the Model "X" Splitdorf magneto and coil that is advertised in the classified want columns of THE AUTOMOBILE for October 23 by the Times Square Automobile Co., of New York.

One other thing, I have been unable so far to get the steering gear off to examine the same to see as to whether the lost motion can be taken out or not, the gear seems to be fastened between the chassis and engine in such a way that after taking out the bolts it will not come out.

J. L. G.

Back Bay, Va.

—1—Probably if you send your coil back to the factory, as you suggest, and have it repaired it will operate with a fair degree of satisfaction for some time, and considering the expense of installing an entirely new system it is probably the best thing for you to do. A non-vibrating coil with batteries or a magneto would undoubtedly give you less trouble, as the Elmore company abandoned the vibrator coil for the Atwater Kent system in 1907 or 1908 because they had trouble with platinum points burning up, due to the fact that they were called upon to operate twice as fast on the Elmore as they would be on a four-cycle machine.

The Splitdorf model X magneto is a standard make and ought to give satisfaction if your car has a four-cylinder motor. However, if it is equipped with a three-cylinder motor, you will have to buy a magneto that is designed for a three-cylinder, instead of four. On the four the magneto

should run at twice the crankshaft speed and on the three-cylinder at one and one-half times.

2—We are unable to obtain any information either on adjusting the Elmore steering gear or removing it from the car, as the Elmore company is no longer doing business.

Four More Economical Than Six

Editor THE AUTOMOBILE:—I have had an argument with a friend in regard to consumption of gasoline in a six and four-cylinder car. I claim a six-cylinder car does not consume more fuel than a four of same weight and piston displacement.

Let me know which car will consume more gasoline and why.

Morrisonville, N. Y. A. H. TAYLOR.

—A four-cylinder motor consumes less gasoline than a six-cylinder one of the same horsepower and speed because the mechanical efficiency of the former is greater. A moment's thought will show that there must be more friction in the six-cylinder motor because the piston surfaces are greater, there are two more connecting-rods, with bearings at each end, one or two more main bearings, four more valves with their extra push rods, springs and cams, all consuming power. Thermally, the six-cylinder motor is also slightly less efficient due to the greater surface exposed to the burning gases and the consequent increased loss through radiation to the water-jackets.

Signs To Promote Safety

Editor THE AUTOMOBILE:—I am inclosing herewith an article taken from a Boston paper entitled New Signs to Make Motoring Safer. I have been a motor enthusiast for the past 12 or 14 years, and since the first Vanderbilt races in which characters of this kind were used, I have approved of them. I understand that these characters are used by the automobile clubs of France throughout the entire country.

I have been a very ardent supporter of the different automobile clubs of which I have been a member adopting some such characters, as their use would be so far superior to any road signs which we have today, both in giving the desired information to motorists, and the difference in expense between different organizations getting out their own, and some one or two concerns getting out quantities for a great many different clubs.

I have never talked with any motorist who has not fully agreed with me, but that is as far as the matter has ever been carried, and I was very glad to notice yesterday that this paper took up this question, and I hope that they will continue the crusade, as there is no doubt in my mind, that if signs of this kind were adopted, it would be the means of saving many lives, for most of the signs as they are displayed today by the roadside only give a motorist a chance to read about two words before he is past the sign, and will have to ask someone in the car what the sign said. I have had this happen many times. I have been a reader of your valued paper for many years, and I believe you also are well equipped, if you think well enough of this proposition, to start something which might bring results.

Boston, Mass. JOHN W. HORTON.

—Using general warning signs of this nature is becoming more and more necessary because of the improved conditions of our highways. It is true that our present direction signs have done an excellent work and continue to do so. It is a fact that often these are too small to be read when going at speed, but nevertheless they can be readily read at speeds of 15 miles per hour. The present signs could be suplemented to the very best advantage with a code of danger-signal signs such as outlined. But go one step further and in conjunction with the railroad signs have a red light mounted on the dangerous ones for night use and if possible the railroad warning bell should also be used.

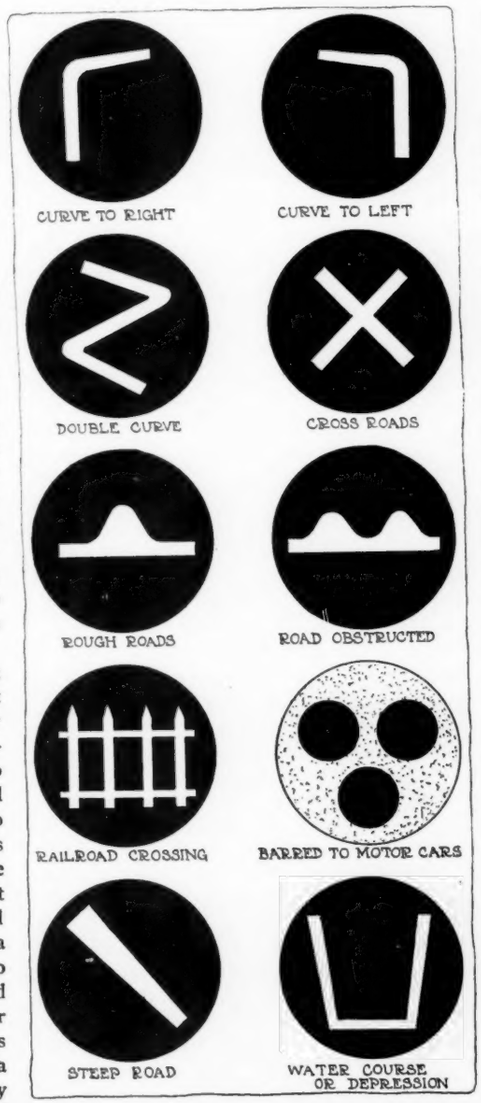


Fig. 1—Standardized signs indicating road conditions. Reader advocates them as safety factors

Economical Small Motor

Editor THE AUTOMOBILE:—Kindly answer the following questions pertaining to motors, sizes 4.25 by 6 and 4.25 by 7.

1.—Which motor will give the more mileage per gallon of gasoline?

2.—Which motor will be the better hill climber?

3.—Which motor will knock quicker?

4.—Which motor will drive smoother, running slow on high gear?

5.—Which motor do you think is the better for all-round conditions?

6.—Which motor will wear the longer?

Cleveland, O. A. I. LEWES.

—1.—The smaller of these two motors will give better mileage per gallon of gasoline because other things being equal it must operate at a higher load factor.

2.—For a given car weight and gearing the 4.25 by 7-inch motor will show a better performance on hills but at most the difference will be very small.

3.—There is no reason why one motor should knock any sooner than the other if the cylinders are free from carbon, the carbureter properly adjusted, all the bearings tight and the cooling system in good order.

4.—The motor with the longer stroke should pull the car a little more smoothly when running slow on high gear although, it is questionable whether it will be possible to notice any difference between the two.

5.—It is hard to say which is better for all around use, but judging from American practice we would say that the smaller motor is more widely appreciated.

6.—If you assume the same piston speed for both motors the longer stroke one should give more service because its rotative speed would be less, but if both motors are designed to run at the same number of revolutions per minute the shorter stroke motor should wear better as its piston speed is lower.

Higher Garage Rates

Editor THE AUTOMOBILE:—I am a garage owner and am therefore in touch with most of the questions that bother automobilists. This is particularly true of the troubles of the city motorist who, of course, is most bothered by the high cost of keeping an automobile.

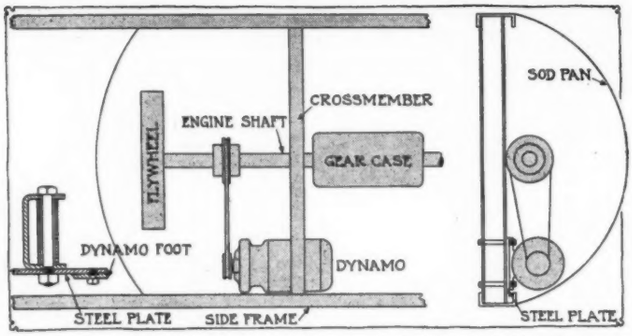


Fig. 2—Gray and Davis generator as applied to the 1911 Cadillac. The generator shaft is belt driven

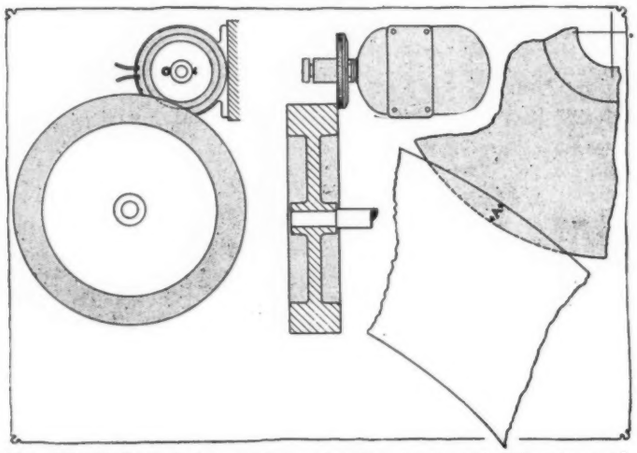


Fig. 2A—Holtzer-Cabot system, showing front and side views of generator at left and enlarged view of driving pulley at right

The greatest item of cost to the man who keeps his car in the city is the monthly garage charge. The storage bills, which would amount to nothing were he in the country, run all the way from $15 to $35 a month, whether the car is run 5 miles or 500 miles during the month.

It appears that the washers and polishers of this city, and perhaps of other towns, have combined into a garage laborers' union. The object is to secure more pay for men who are doing that sort of work. As everyone knows who has run a garage, the margin of profit is very small and the wages of the men employed cut deeply into the income. Therefore, if any increase was made in the wages of the men, an increase would have to be made in the income or the garage would go out of business.

There is only one way to increase the income and that is by charging more to those who store the cars in the garage and it is doubtful if many of them would feel as if they could afford to pay it. This would decrease the number of cars in the garage and hence would cause a falling off of the income, even though the individual price had been raised. In fact, it would cause many of the cars now in active service to be thrown back on the second-hand market with a consequent falling off in business in the whole industry.

The danger is not so great, however, as has been pointed out, because the men employed as washers and polishers are not skilled laborers. Any man can do the work as it is not a question of brains but of "elbow grease." Therefore, if the garage men maintain a firm attitude and refuse to entertain any but reasonable views there should be no cause for alarm.

New York City. EDWARD B.

Generator Can Be Applied to Car

Editor THE AUTOMOBILE:—Is it possible for me to apply an electric lighting system to a 1911 model 30 Cadillac? I should like to apply either a Gray & Davis or Holtzer-Cabot and would like to know how these should be applied. I understand that the Gray & Davis system can be applied by a belt to the engine shaft of the Cadillac and that the Holtzer-Cabot has a friction drive arrangement by means of which it can be fitted to any car.

New York City. M. P. S.

—Both the methods that you mention are practical and, in fact, blueprints have been issued by both the Gray & Davis company and the Holtzer-Cabot showing the installation. These blueprints are reproduced in Figs. 2 and 2A. In Fig. 2, showing the Gray & Davis dynamo installation, it will be noted that a pulley is installed on the engine shaft between the gearcase and the flywheel and the dynamo itself is bolted to the cross bar.

The Holtzer-Cabot installation shown in Fig. 2A, is simply having a friction wheel which is pressed against the surface of the flywheel. In this installation the dynamo can be put on either side of the flywheel as it is designed to operate in either direction. The friction contact wheel must not overlap the flat face of the flywheel a distance of more than .5 inch and furthermore the holes drilled in the flywheel where balanced, lying within the range of contact of the friction flange should be plugged with wooden plugs sawed or chiseled off to a flat surface.

Timing for Single Cylinder Motor

Editor THE AUTOMOBILE:—I am building a single cylinder, air-cooled, four-cycle engine and wish to obtain high speed as well as hill-climbing power. The bore is 4-inch, stroke 4 13-16, diameter of exhaust valve 2.5 inches and intake 1.75 inches.

Please inform me as to the best results in timing this motor?

1—How much lift for exhaust valve?

2—When should exhaust valve begin opening?

3—When should it close?

4—When should intake valve open and close?

5—How much cold compression would you recommend?

Portland, Ore. A. W.

—1—Make the lift of the exhaust valve 3-8 inch.

2—The exhaust valve should open somewhere between 40 and 50 degrees before lower dead center depending on the speed of the motor, the earlier opening for a very high-speed motor.

3—Closure should occur at dead center.

4—The intake valve should open on upper dead center and close about 20 degrees after lower dead center.

5—Sixty pounds compression will be satisfactory.

Motor Misses with Spark Advance

Editor THE AUTOMOBILE:—I have a 1912 Jackson with a Kingston magneto and coil. It misses with the spark fully advanced when traveling at a rate less than 25 miles per hour. When I go over that speed it runs finely. It runs well on the batteries but when I go less than 25 miles an hour if I pull the spark lever back about 1-32-inch it runs all right, or if I pull the breaker box from the stop on the advance side, it runs all right but the minute I advance the breaker box against the stop or as far as it will advance, it starts to jerk and miss and finally stops if I don't retard the spark. On batteries I can advance the spark all the way and the motor runs smoothly. There are no wires to touch each other, because they are new and the fault is not in the engine, as I removed all the carbon. It is not in the coil as I had a Splitdorf coil on and it acted the same way. I took the magneto to Philadelphia and the service station charged the magnets but it did not help.

Reading, Pa. H. E. N.

—On the face of it your trouble seems to be more in the line of improper mixture than magneto trouble. If it is in the magneto, however, it would seem to be that at low speeds with full advance the sparks at the plug points are not as hot as they should be. A weak spark at full advance is due to the armature of the magneto being in the wrong position to develop a hot spark at the time that the points in the breaker box separate. If the points on the magneto are worn down it could have the effect which you mention. In looking over the magneto you

should examine these to see if they are flat and not worn away. A small amount of wear on the points can be adjusted by taking up on the set screw and tightening with the lock nut. The armatures of these magnetos are in three pieces, and very often the screws which hold these brass plates become loose. If you take the magneto to a service station to be re-charged these should be examined.

Should the trouble not be found in the ignition, it would be well to go over the valves to see if there is any leakage between the valve and seat. Should the valves be worn or pitted they should be re-ground. It is always possible to carry a higher spark advance with tight valves than with leaky ones. Sticking valves, particularly on the exhaust side, should be guarded against.

Larger Tires Increase Speed

Editor THE AUTOMOBILE:—We have a Studebaker 30 which was equipped with the regulation size 32 by 3.5 tires. We have now fitted the rear wheels with 33 by 4 tires. How much faster is this machine now geared?

Liberty, Ind. C. F.

—Tire sizes refer to the outside diameters of the tires, so 33 by 4-inch tires will increase your speed about 3 per cent. or in the ratio of 33:32. If, with the 32 by 3.55 inch tires the car was capable of a maximum speed of 50 miles per hour, with the larger tires a speed of 51.5 miles per hour may be attained.

Car Jerks When Throttled

Editor THE AUTOMOBILE:—I have a 1913 Reo roadster with a National magneto and batteries on which to start. I have run 2,800 miles without trouble of any kind, but recently when running under 15 miles per hour the car jerked and jumped as if something were going to break. Over 15 miles per hour it runs like a clock. It is the same on magneto or batteries. I tried a different adjustment on the carbureter and as a last resort I changed carbureters from a Holley to a Schebler, but that made no difference. I have good compression but I was going to grind the valves as this has never been done, but before I do any more, I would like to get your advice.

Bayonne, N. J. JOHN T. CONNELLY.

—This jerky action of the motor is undoubtedly due to a missing cylinder, and the cause may be from spark-plug points too far apart, the proper distance being 1-32 inch. If the spark-plugs are all right see that the insulation on all the wiring is in good condition, that there are no short-circuits and that all connections are tight, then inspect the brushes on the revolving coil and distributer. The brushes on the revolving coil are gotten at by removing the two screws A and the cap B, Fig. 4. The brushes are illustrated at C. The ends of these brushes should be flat and smooth and if they are not so, they should be filed until they make a good electrical contact with the plates on which they bear. Next, take off the cover of the distributer case by removing the two screws at D and file the brushes contained in this case if they need it. If, however, all these brushes seem to be in good condition, take off the distributer plate E by removing the two screws F thus exposing the breaker box. Examine points G in the breaker box, noticing whether they are burned away and, if so, smooth them off with emery paper. See that these points are in proper adjustment. The distance between them should be 1-32 inch when the roller H is not in contact with the cam J.

It would be well to clean any of the interior parts that are dirty and also see that all parts are tight and the insulation in good condition.

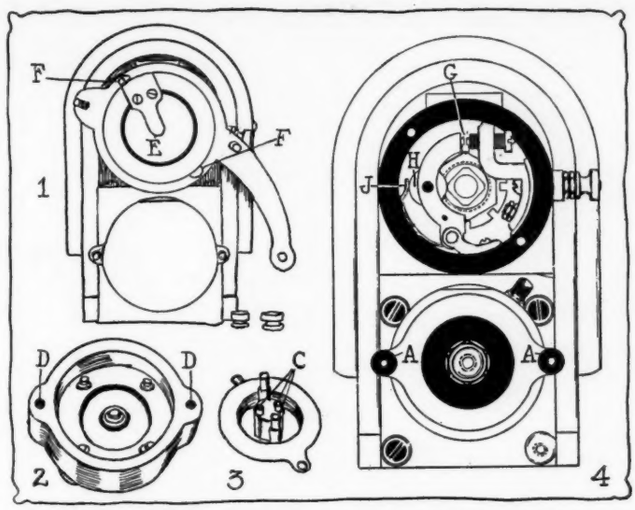


Fig. 4—National magneto partially dis-assembled, showing the brushes requiring attention

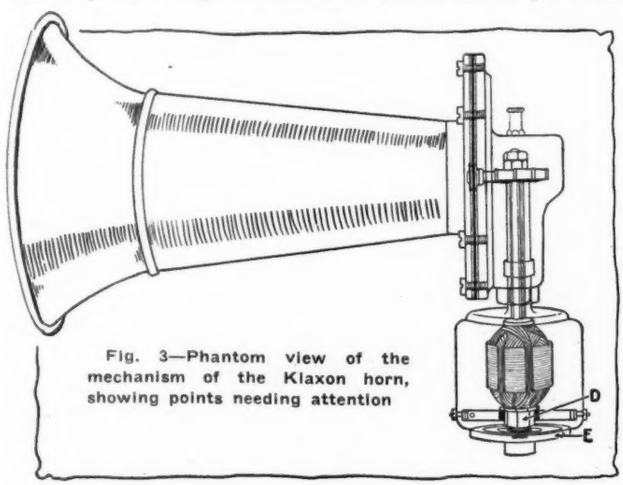


Fig. 3—Phantom view of the mechanism of the Klaxon horn, showing points needing attention

Wrong Piston Displacement

Editor THE AUTOMOBILE:—I am much interested in the performance of racing cars, especially in view of the results obtained with gradually decreasing cylinder capacity.

I notice in your issue of September 4 that in the Mercer car driven by De Palma, the cylinder dimensions are given as follows: Bore, 4.819; stroke, 6.819, and displacement, 446.

There must be some error in these figures, as the displacement of such a cylinder is 497 cubic inches. Will you advise me as to whether there is an error in the figures in stroke or bore or in the displacement, as given in the list?

Boston, Mass. Q. A. HAW.

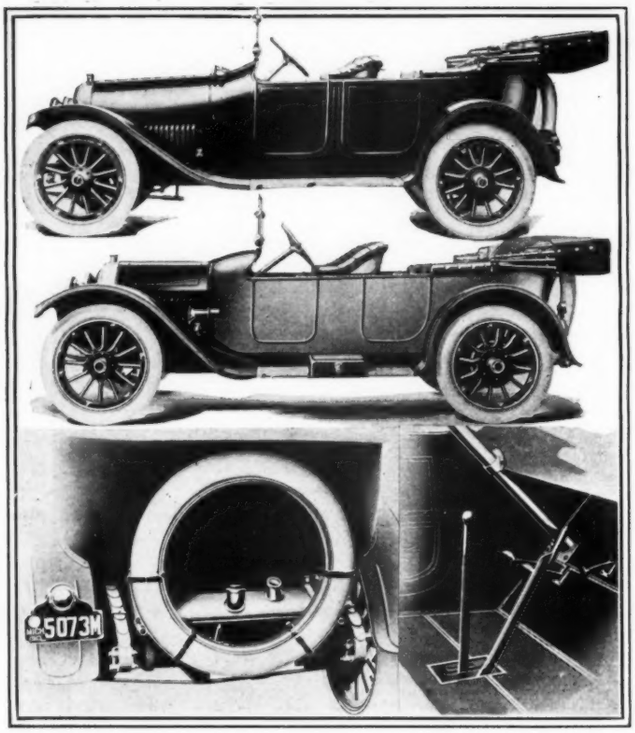
—You are right. There was a slight error in all three figures, bore, stroke and piston displacement. The correct cylinder dimensions are 4.814 by 6.188 bore and stroke, giving a piston displacement of 450.1 cubic inches.

Gasoline and Kerosene Mixed

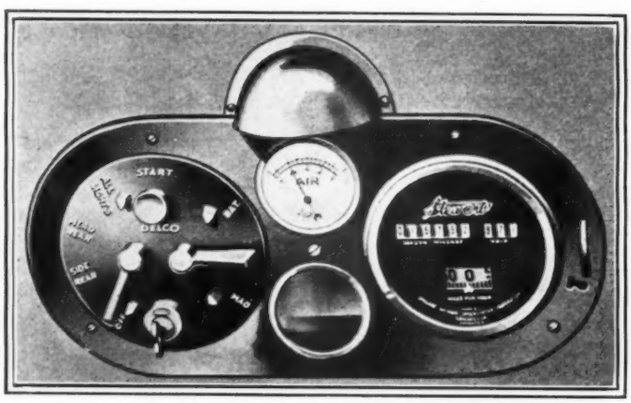
Editor THE AUTOMOBILE:—Has kerosene ever been mixed in equal parts with gasoline and used to any extent as fuel for automobiles? If so, with what satisfaction as compared with gasoline alone except as to cheapness?

Amelia C, H., Va. P. T. SOUTHALL.

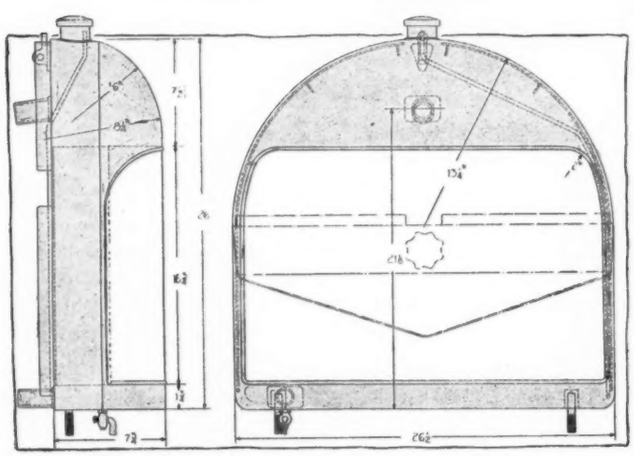
—This mixture has often been tried and no one of whom THE AUTOMOBILE has any record has ever reported it to be good. Carbureter difficulties have been encountered wherever it has been used. It seems that the gasoline part of the mixture passes through the jet along with the kerosene and the latter remains in globular form while the gasoline is vaporized. This is particularly true at low speeds. Better satisfaction could be obtained by using a carbureter adjusted to run on kerosene alone. The results would be uniform and there would be more of a tendency for the fuel to act as a unit instead of in parts.



Top—New Oakland six-cylinder touring car. Middle—Oakland big four touring type. Bottom—Rear of car, and, at right, control levers



Dash control board on Oakland six



Radiator on the new Oakland six, showing the round top

Oakland Has Two Fours and a Six

Small Four Is Continuation of 1913 Model—Six is New—Big Four Is Larger Than 1913 Type

A SMALL four, a big four, and a new small six have been announced by the Oakland Motor Car Co. for next year. The small four is a continuation of the 1913 model; the small six is a brand new product, and uses the same cylinder dimensions as the small four; the big four is a larger model than listed this year having 4 1-4 by 5 1-4 cylinders, which is 1-8-inch greater bore and 1-2 inch more stroke than used at present.

The small four, officially known as Model 35, uses 3 1-2 by 5 cylinders, giving a piston displacement of 192.4 cubic inches, and a horsepower rating of 19.6. It has a bore-stroke ratio of 1.43. With a 112-inch wheelbase it lists at $1,200 as a standard touring car, and as a roadster, $1,150.

The small six, Model 48 cylinders, 3 1-2 by 5, has a piston displacement of 288.6 and a rating of 29.4 horsepower. It has 123.5-inch wheelbase, lists at $1,785, with standard body types, and with such special bodies as coupé, sedan and cabriolet at higher figures.

The big four Model 43, cylinders 4 1-4 by 5 1-4, has 297.8 cubic inches piston displacement, and a rating of 28.9 horsepower, It is made with 116-inch wheelbase and as a touring car lists at $1,785, with inclosed types at higher rates.

All of these models are listed with full equipment in contrast with this year when equipment was extra, this equipment in all cases including the Delco combined lighting, cranking, and ignition.

Oakland cars for next year have many body refinements, the streamline body being used. The characteristic V-shaped radiators with German silver tops are continued on the two fours in the same design as used this year. To meet the requirements of the rounded hood, the radiator of the six is rounded at the top but in other respects it conforms to the same V design.

As a body feature the double-stop, non-continuous running board has been discontinued. The six has cast-aluminum running boards of a very distinctive appearance. The big four is equipped with a shallow box for tools or other articles on either side between the cast aluminum steps which are of modified design over last season's. Thus the running boards of this car are virtually continuous. This tool box idea gets away from the box on the running boards which was so prevalent on cars of the past, but at the same time gives additional carrying space.

Left Side Drive Introduced

But Oakland improvements are not all in body refinements. The chassis have received attention. Conspicuous all through is the adoption of left-hand steering with center control levers, the detail arrangement of which is shown in the sketches on the opposite page, this marking the entry of the company into the left-hand field. Pressure feed of gasoline is used for the first time. Work has been done to reduce the weight of reciprocating parts in the Northway motors used in all models; a double type of exhaust manifold has been fitted to the six, and other improvements added.

Many of the characteristic Oakland features for this year are continued. The cone clutch, the circulation oiling scheme, and many other details have not been disturbed.

The motors are of the L-head, unit-constructed type and suspended from the frame at three points. Flywheel, clutch and gearset are housed integrally, the gearbox portion bolting to the rear of the crankcase. Valves are on the left.

The six power plant dimensions correspond, wherever consistent, with those of the small four. Cylinders are cast in a block and integral with the upper half of the crankcase. Four crankshaft bearings are used. The drop forged camshafts have integral cams. Both generator and camshafts are driven by spiral gears.

Pistons ground to size and fitted with three ground eccentric rings each, are built as light as possible in order to give the least vibration at high speed. Since the pistons are electrically treated before grinding, internal strains are relieved to insure against warping.

The six motor has an exhaust manifold of the double-way type, made necessary to prevent the exhaust from one cylinder entering another due to two exhaust valves being open at the same time. The cylinders at the end of the exhaust stroke will be practically free from gases and the capacity of the following inlet charge will not be affected by the burned gases of the previous explosion stroke. It is claimed for this double exhaust construction that it prevents heating and carbonizing of the exhaust valves, as two successive explosions do not pass the same valve opening. This double contruction is obviously not necessary with four-cylinder engines where there is no overlap of the valve openings.

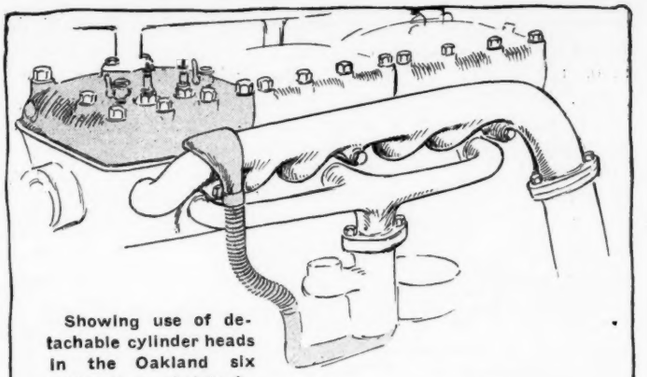
The inlet manifolds are also of special design, care being taken to cut down resistance and to give each cylinder an equal amount of gas. The throttle shaft has been arranged parallel with the center line of the car, at right angles to the conventional way of mounting. Consequently, the throttle valve which according to Oakland engineers generally acts as a deflector and which, by the generally adopted construction, tends to throw the gases toward one end of the motor, will as arranged on the Oakland six, distribute the inlet gases equally to each cylinder of the motor.

Has Removable Cylinder Heads

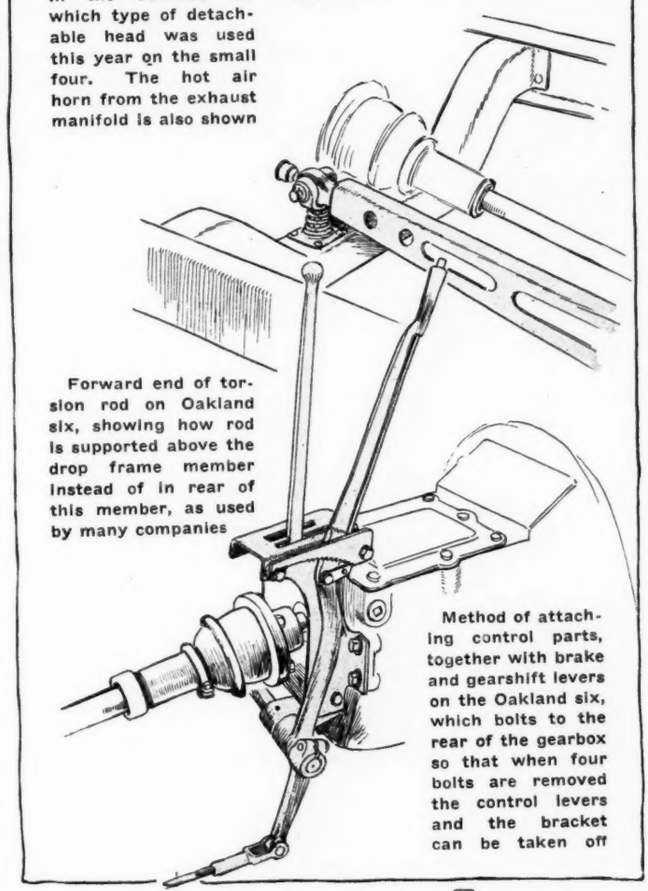
A special feature is the removable cylinder head construction each two cylinders being capped with a head held down by nine holding bolts. The spark-plugs, priming cups and connection to the water manifold are taken care of by these heads. The construction makes it an easy matter to get at the tops of the pistons and the cylinder walls. This removable head construction is also employed on the small four this year.

The oiling system is unchanged, although the adjustment for the stroke of the oil pump has been made more accessible so that by turning a nut the amount of oil may be regulated. Lubrication is by splash with circulation maintained by the cam-operated plunger pump. Below each connecting-rod is an oil trough. The lubricant eventually runs into a sump in the lower part of the case from which point it is recirculated.

The Delco combination cranking motor, generator and ignition



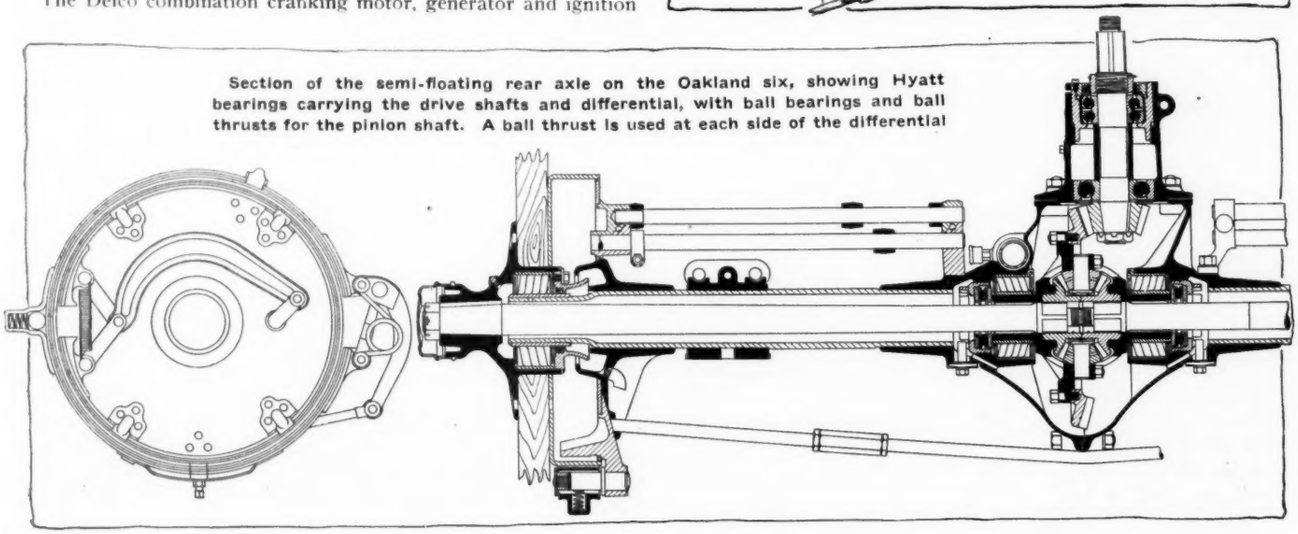
Showing use of detachable cylinder heads in the Oakland six which type of detachable head was used this year on the small four. The hot air horn from the exhaust manifold is also shown



Forward end of torsion rod on Oakland six, showing how rod is supported above the drop frame member instead of in rear of this member, as used by many companies

Method of attaching control parts, together with brake and gearshift levers on the Oakland six, which bolts to the rear of the gearbox so that when four bolts are removed the control levers and the bracket can be taken off

Section of the semi-floating rear axle on the Oakland six, showing Hyatt bearings carrying the drive shafts and differential, with ball bearings and ball thrusts for the pinion shaft. A ball thrust is used at each side of the differential



device is located at the right rear, adjacent to the flywheel, to which its gears mesh when cranking. As a generator and magneto, it is driven from the safe shaft which drives the water pump; the distributer, however, is separate from the main electrical unit and occupies a position on the left front and is driven by a vertical shaft from the timing gearing.

A starting pedal is provided on the toe board and with the system as now used the cranking speed has been increased fully 50 per cent. The motors are turned over at about 130 revolutions a minute. The new Delco system is of the six-volt type, with a single-wire-and-grounded-return plan, making a very simple pattern.

Exide storage batteries are used, 80 ampere hours on the small four. The six and big four use a 100 ampere-hour type. The gear reduction between the engine and the motor when in position for cranking is about 25 to 1. As a generator the unit is driven at engine speed on the fours and at 1.5 engine speed for the six. Suitable cutout switches prevent overcharging and protect against short circuits.

As mentioned, the ignition apparatus has been separated from the motor generator. Setting of the spark is accomplished by unscrewing a nut in the center of the distributer shaft after unclasping the cover of the distributer.

A Delco feature for 1914 is the equipping of a voltage regulator which allows the generator to charge at a higher rate when the battery is low on account of undue cranking or after leaving the lights burning all night. It is stated that this voltage regulator will, under all conditions, keep the battery fully charged. The battery is carried under the front seat on all models with the exception of the big four on which the 1913 mounting on the right front fender is retained.

The Big Four Design

All features of the big four-cylinder motor are consistently uniform with those of the other two except that the cylinders are cast in pairs, have integral heads and bolt to the aluminum crankcase, which is divided horizontally.

So far as possible the chassis design of all models has been standardized. The clutch is a leather-faced cone with spring inserts underneath. The gearset is a three-speed, selective type, and on the new six a special control lever assembly has been designed to bolt to the rear of the gearbox. Four bolts, which when removed, allow the control levers to be removed together with the shifting H-gate and emergency brake ratchet.

Models 48 and 43 drive to the axles through an uninclosed drive shaft, parallel to which is a well-designed torque arm. The shaft has two universals. The front end of the torque arm is supported by a cushion spring in order to save the rear axle gears from sudden stresses. On the new six, this front spring of the torque arm sits on top of the frame cross-member and is provided with a grease cup to lubricate the hinge portion. The drive is taken by the front ends of the lower halves of the three-quarter springs.

The small four's propeller shaft is inclosed within a torque tube and has a single universal joint at its front end.

The six and small four have semi-floating axles, but the big four is equipped with a floating type. All have conventional bevel ring gears and pinions and differentials. Nickel steel plays an important part in this rear unit.

Brakes expand internally and contract externally, model 43's service brakes acting in the former manner and the emergency in the latter. With the other two cars the reverse is true. The brakes are fitted with an easy and accessible adjustment device on the axle which does away with the usual method of adjusting by lengthening the brake rods. A single turn of a hand wheel, on axle, takes care of the brake wear.

Pressure Fuel Feed Universal

All the 1914 cars have the gasoline tank at the rear feeding to the carbureter by pressure. The tanks have gauges and large filler caps, and a new design of air pump gives the necessary pressure on the fuel. This pump has a relief to provide any desired pressure, the recommended amount being 2 pounds per square inch.

Tire carriers are of special design and permit easy mounting and demounting of the spare tire. Two rounded metal pieces are fastened from brackets at the rear corners of the frame and behind the gasoline tank. Recesses in these strips take the straps which hold the tire in place. These are said to positively prevent chafing of the tire and at the same time are rattle proof.

The principal motor and chassis dimensions of the cars follow:

MOTORS

Crankshaft Bearings

Model	Front	Center	Center	Rear
35	1 5-8 by 3 3-8	1 7-8 by 2 3-8		1 15-16 by 3 11-16
43	1 7-8 by 3 9-16	2 by 2 3-4		2 1-4 by 4 1-8
48	1 5-8 by 3 3-8	1 3-4 by 2 5-8	1 7-8 by 2 5-8	1 15-16 by 3 11-16

Valves

Model	Diam. in the clear	Outside diam.	Lift
35	1 9-16	1 23-32	11-32
43	1 3-4	1 29-32	11-32
48	1 9-16	1 23-32	11-32

Connecting Rods

Model	Lower bearing	Length
35	1 5-8 by 2 1-4	10 3-8
43	2 1-8 by 2 1-4	11
48	1 5-8 by 2 1-4	10 3-8

The first dimension in each case applies to the diameter.

CHASSIS

Springs

Front—half elliptic; rear—three-quarter elliptic.

Model	Front length	Rear length	Width
43 and 48	41 1-4	50 7-8	2
35	35 1-4	48	1 3-4

Frames

Model 35 Single drop. Channel 3 3-4 inches; 3-16 inch stock
Model 43 Double drop. Channel 4 inches; 5-32 inch stock
Model 48 Single drop. Channel 4 3-4 inches; 5-32 inch stock

Brake Drum Diameter

Models 43 and 48—14 inches Model 35—12 inches

Standard Gear Ratio

Model 43; 3.7 to 1; 3.5 to 1; 4 to 1 Model 35; 4 to 1
Model 48; 4 to 1

Gasoline Tank Capacity

Model 35; 15 gals. Model 43; 21 gals.
Model 48; 18 gals.

New Napier in 66,000-Foot Alpine Climb

The trial of a new model Napier recently carried out under the official observation of the Royal Automobile Club was of a nature that distinguishes it from all the previous official trials of the Club. Already Napier cars had climbed all the formidable hills of the United Kingdom, and now the latest production of the company—a 30 horsepower (29.5 by R.A.C. rating) six-cylinder touring car—has been put through an exacting mountaineering test, climbing in less than a fortnight a number of famous passes in the Alps and the Dolomites. Altogether the total climbing amounted to 66,000 ft.

In the certificate issued by the R.A.C. the performance of the car is described in the following terms:

"The total distance traveled was 2106.5 miles, which was covered at an average speed of 20.3 miles per hour. The fuel consumption was at the rate of 18.09 miles per gallon, or 41.08 ton miles per gallon. The weather was good to fair, with much rain on two days. During a stop to fill up with petrol on the last day but one of the road trial one of the bolts holding the petrol tank was found to be loose. It was tightened in 2 minutes, 8 seconds. No other work was done during the trial, and no water was put into the radiator. After the road trial the car was driven to Brooklands track, where it was timed over the flying half-mile, the speed attained being 62.61 miles per hour. The running weight of the car during the speed test was 5,005 lb." Four passengers were carried and the trial lasted from September 13 to 27.—*The Car.*

The Engineering Digest

The Regulation of Carbureters for Fuel Economy, Especially with Models Now Out of Date

Specialist Relates What May Be Done to Have Old Equipment Work at Its Best, Reviewing at Same Time the Principles Which Continue to Hold Good for Latest Designs

NUMEROUS are the devices for economizing on gasoline which have been placed in the market recently or have been incorporated in new models of carbureters, but the ideas embodied in them can be reduced to two. Either the object of the device is to enable a driver to increase the percentage of air in his gas mixture when the motor is running with light load and at average or high speed, or it is to effect a more intimate mixture of gas and air than the construction of the carbureter in itself affords. Both methods may be combined. In any case it is required that the special necessity for having rich mixtures at disposal for starting or for running a motor slowly under heavy load—as when going up a hill on direct gear—is not interfered with. Other efforts for economizing on fuel by improvement or specialization of the motor or of the lubrication are of a different order, and, if it is not merely the nature of the lubricant which is involved, are of no direct practical interest to the thousands of motorists who already possess an automobile and do not wish to buy a new one or to have a modernized carbureter fitted to the old one.

The general unrest with regard to this question of fuel economy has prompted a German specialist to explain at some length the methods used for trying and regulating carbureters, so that car owners at all events shall not be induced to undertake improvements before they have made sure of the degree of economy they may be able to reach by the means already at their command. The principal points in his explanation are rendered in the following.

Colors of Exhaust Gas Disclose the Mixture

The correct regulation of a carbureter is rather difficult if the car is required to be speedy as well as economical, as a maximum speed calls for rich mixtures and economy for poor ones. One must either make up one's mind in one direction or in the other or else accept a compromise. It is also true that the most economical regulation for the use of the motor on a test stand, where a motor is tried out with full charges, is not the most economical for ordinary driving, at which full charges are very seldom used. Correct composition of the gas mixture can be ascertained by observing the color of the exhaust flame at an open petcock. At low and medium motor speeds the color should be a dark-blue shimmering into purple and, as the speed is raised, it becomes paler and, at the maximum, light-blue and almost transparent. Under no circumstances should the flame lose a distinct bluish shade. If the mixture is very poor the flame becomes a pale yellow and eventually invisible. A very rich mixture makes it reddish and smoky. These indications are only reliable, however, if the lubrication of the motor is in good order. The exhaust at the end of the exhaust pipe should, under the same condition of correct lubrication, be colorless and almost odorless, causing only a light sepia shade on a sheet of white paper held against it at a short distance from the end of the pipe.

Smoky and light-brown coatings of the porcelain at the spark end of plugs indicate respectively too rich and correct mixtures, while a porcelain remaining white shows that the mixture averages too poor.

Drawbacks of Over-sized Carbureters

The right size of a carbureter is determined by the size of the induction valve opening and not by the cylinder volume or the piston displacement. In a four-cylinder motor the area of the gas outlet from the carbureter should equal the area of one valve opening, as only one valve at a time is operated. The valve opening area is approximately: Valve lift multiplied by valve diameter (the mean of the outer and inner diameters) multiplied by 3.14. If a carbureter is too large for the motor, the latter is less responsive and also less economical, because the speed in the mixing chamber is too low to effect an intimate mixing of the gas and the air. It is also harder to start, as it is necessary to turn it rapidly in order to get enough suction at the jet.

A carbureter which is too small cannot give a full charge at high motor speeds and therefore reduces the power capacity of the motor. It is also liable to get very cold, even to freeze up, as the small dimensions do not permit the gas to draw enough heat from the walls. If a car is driven on the low gear over a long and steep grade as fast as possible, a carbureter which is too small will be drawn dry and the motor will eventually be stalled for lack of gasoline feed.

Correct Height of the Gasoline in the Jet

Usually the gasoline should stand about 3 millimeters below the mouth of the jet, but in special cases another height may be prescribed. To make sure that it stands at this height it is necessary to unscrew the jet and insert in its place a glass tube, or another tube of such width that the stand of the liquid can be seen from the top, and to place the jet next to it for comparison. The connection of the tube may be calked with soaped cotton yarn. If the needle valve of the float chamber is not adjusted to give the right height, it is usually necessary to turn the adjustment sleeve either to the left, for slower feed, or to the right, for more rapid feed, and, in order to avoid repeated filling and emptying of the float chamber, it is convenient to use an American method which consists in having a tin can with a wire handle, by which it may be hung away to one side while effects are being observed, a short copper tube soldered to the middle of its bottom, a foot of rubber tubing connected to this nipple and the other end similarly connected with the gasoline inlet of the carbureter. This contrivance may be used as a siphon to either draw gasoline from the float chamber or filling it, accordingly as the can is held lower or higher. When the adjustment of the needle valve has been found which produces the right height in the trial jet, the normal jet is of course put back in its place.

Air Regulation of Old-style Carbureters

While constructions differ so much that precise rules cannot be formulated to fit all cases and recourse to the instruction books of the makers must be advised where the general rules do not suffice, it is possible to outline a method of proceeding with reference to the main types.

The old style without additional air inlet can only be regulated by trying a number of different jets and air cones, choosing the smallest jet by which the top speed of the car is not

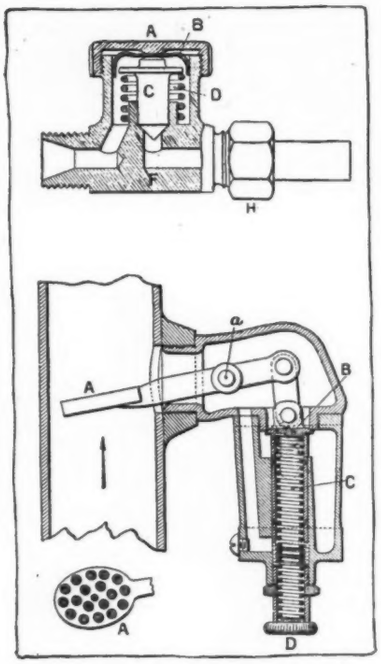


Fig. 1—Non-Leaking Gasoline Valve
Fig. 2—Air Valve Regulated by Gas Speed

reduced in combination with a cone large enough to avoid getting too rich a mixture.

The single-jet carbureter with automatic additional air action is tried out for vehicle speed with smaller and smaller jets, and when one is reached which maintains the maximum speed obtainable with the larger jets but begins to show sluggishness for accelerations, the tension of the valve spring regulating the additonal air is reduced until this fault—the sluggishness — is remedied. This completes the regulation, if the motor does not now consume more gasoline. Still it is preferable to make three other tests; first with the motor running idle slowly, the gear lever on neutral, the spark retarded and the throttle as nearly closed as possible, secondly, idle and fast, spark advanced, and thirdly on the road with numerous accelerations of the motor, both gear changes and throttle being employed to vary the motor speed. The carbureter should function properly under all these conditions; no cylinders should skip and carbureter explosions should not occur when the throttle is quickly opened or closed.

Manipulating the Air Spring

When the motor is running idle the throttle should be opened and closed a number of times with the spark-timing different, and if in any case the exhaust becomes smoky or the carbureter puffs, it may be concluded that the mixture is too rich or too poor and the valve spring is accordingly tightened or slackened.

When finally the motor runs to all appearances satisfactorily it should be made to run idle at nearly the lowest speed at which it can be kept running regularly, and then the setscrew for throttle adjustment should be fixed in the position preventing further closing. When now the motor is sped up and puffs from the carbureter are noticed, the spring of the additional air valve is tightened a little. Under no circumstances should the height of the gasoline column in the jet be changed after once being established. The last test consists in taking the car out on the road and running it slowly up a grade and while it is so running trying to speed it up by the accelerator pedal. If one or two cylinders skip occasionally, either the ignition is not active enough or the mixture is still at fault. Even in this case, however, it is not necessary to conclude that the only thing to do is to buy another carbureter. The additional air spring may be stretched or compressed and put back again to see if it will cover the range of requirements better than before, or another spring may be tried. A good rule for deciding whether an air spring is of suitable strength and temper is that the valve should remain quiet on its seat when the motor is throttled to the lowest notch and should open only a little when the motor runs idle or with light load at top speed. The ever existing difficulty of getting the additional air spring to accommodate its action to the whole gamut of possible conditions accounts largely for the new types of carbureters which have been placed in the market and renders it at all events desirable to provide a device by means of which the driver from his seat can vary the tension of this spring whenever, during operation of a car, the need for a richer or a less rich mixture makes itself known by the signs mentioned in the foregoing.

[The author goes on to describe certain laborious methods for regulating 2-jet and 3-jet carbureters, but their practicability does not seem convincing in view of the many factors of possible error which it is too difficult to eliminate when the question is that of fitting a given carbureter to a given motor. He also treats the subject of adapting a gasoline carbureter to the use of benzol and to various fuel mixtures, but it is admitted that these arrangements are makeshifts which properly should be supplemented by an increased compression ratio of the motor and more efficacious heating of the carbureter and the air supply than is usually provided with motors of any other date than 1914. Similarly the methods recommended for adapting a carbureter to high altitudes and regulating it for winter use resolve themselves into makeshifts for enriching the mixture and this may be done better by auxiliary devices or by carbureters incorporating the action of such devices.—Ed.]—From *Allgemeine Automobil-Zeitung*, October 18.

Auxiliary Contrivances for Reducing Gasoline Consumption, Incidentally Improving Action of Motors

MOST fuel economizers depend for their action upon the depression caused in the carbureter by the suction from the engine, but this depression depends not only on the piston speed but also on the adjustment of the throttle, while the need for additional air, to help filling the cylinder and cooling it as well as for economizing, depends almost entirely upon the piston speed. For this reason a firm of accessory makers in France, Vermesch & Co., have based their economizing device on the speed of the gas mixture rather than upon its density. Between the carbureter and the manifold there is placed a perforated screen A in the manner shown in Fig. 2, so as to be struck by the rising gas mixture, thereby operating a lever of which the other end is connected with the additional air inlet valve, the latter being held to its seat by a spring C adjustable by knurled nut D. The movement of A of course depends upon the velocity of the gas current in which it is placed. The perforations in it also make it act as a mixer.

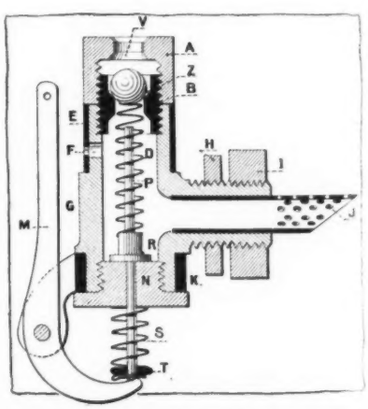


Fig. 3—"France Economizer," natural size, with motor brake attachment

It is stated that a suitable relaxation of the spring C permits the use of benzol instead of gasoline without any interference with the jets of the carbureter being needed, provided the inclosed space around the air valve and spring is heated from the exhaust.

Another device mentioned in *Omnia* for October 18 serves in a different manner to obviate waste of gasoline. It is intended for an admission and shut-off valve on a gasoline conduit, and the characteristic feature of it is that the needle valve C, Fig. 1, which opens or closes the passage of gasoline between the two union nuts H is actuated by means of the knurled screwcap A without the use of any actual joint connecting the interior passage in the valve body F with the atmosphere. To this end, the screwcap has an interior central lug acting against a resilient nickel diaphragm B which in turn acts against the top

of the needle valve, and the edges of the diaphragm are securely fixed in the interior walls of the valve body. The valve is opened by a spring D.

Economizer and Coaster Combined

A device of very small dimensions but endowed with an ambitious range of functions is called the "France" economizer and is described in *Vie Automobile* of October 4. A sectional view of it is given in Fig. 3. Automatically it works as an economizer on the plan of an additional air inlet valve No. 2, supplementing additional air inlet valve No. 1, which is supposed to form a regular feature of the carbureter, but by connecting the handle M with the driver it can also be made to function as a bypass to fresh air for the cylinders when the motor is allowed to run without gas on a long declivity.

The device is mounted by soldering the ring I into a hole three-fourths of an inch in diameter in the carbureter pipe above the throttle and threading the junction pipe of the little apparatus into the ring, securing it by locknut H, so that the perforated nozzle J projects into the fuel current. From this it will be seen that the illustration shows the natural size of the device.

The automatic action is determined by the position taken by the steel ball placed at the top of the spring D. It can rest against either the upper seat V or the lower seat B, closing the air inlet in either case, but it can also be held in suspension between the two seats, in which case the additional air inlet is open. When the motor works slowly with the throttle nearly closed, the suction of the motor causes a very low atmospheric pressure in the intake pipe and its connections. Hence the outside air forces the steel ball against the lower seat B and no additional air is taken in, which is in accordance with the requirements, as rich mixture is wanted for running at minimum power development [provided the compression is safe]. If now the throttle valve is thrown open, the suction on the steel ball is relieved and spring D lifts the ball up against the upper seat. For accelerations the economizer is thus also inoperative, giving no additional air. But when the motor is running normally the pressure in the intake pipe takes a medium value to which the intermediate position of the steel ball has been made to correspond by suitable adjustment. For the purpose of this adjustment the threaded ring Z on which the lower ball seat is formed can be screwed up or down, while balls of different sizes and two springs of different tension are furnished with the apparatus. The ring E can also be turned so as to cover or uncover the holes F, in the latter case furnishing a permanent additional air supply by means of which shortcomings in the design of old carbureters may be corrected.

By raising the stem P by means of lever M until the steel ball is held in suspension the cylinders can be made to draw pure air instead of a gas mixture if the throttle is kept entirely closed, and in this manner the device is used for negotiating long declivities, as referred to above, the air taken in through this narrow channel permitting the motor to be operated as a brake, mainly during the compression stroke, while not forcing the lubricating oil above the pistons by excessive depression tending to a vacuum during the suction stroke. The lever M can also be used operatively to facilitate the starting of a motor which can be started only with the throttle half-open. In that case the steel ball is pressed against its upper seat and the air which would ordinarily enter is completely excluded.

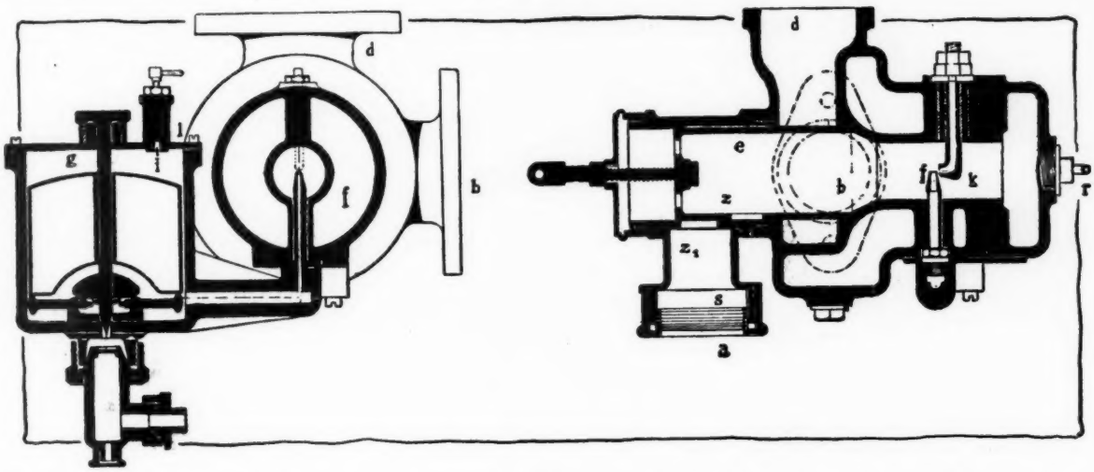


Fig. 4—The Bucherer "Inhalator-Carbureter" designed to work with any fuel and for any number of cylinders. Fuel blown from large jet by direct injector-blast. Double economy claimed

According to a report by Henri Petit, a well-known contributor on automobile engineering subjects, the fuel consumption obtained with a perfectly regulated carbureter was reduced, by the application of this device, from 14.6 liters for 100 kilometers to 12.5 liters, and maximum speed, accelerations and still-running were not affected.

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Injector System Developed in Germany for Feeding Any Fuel to Any Type of Motor

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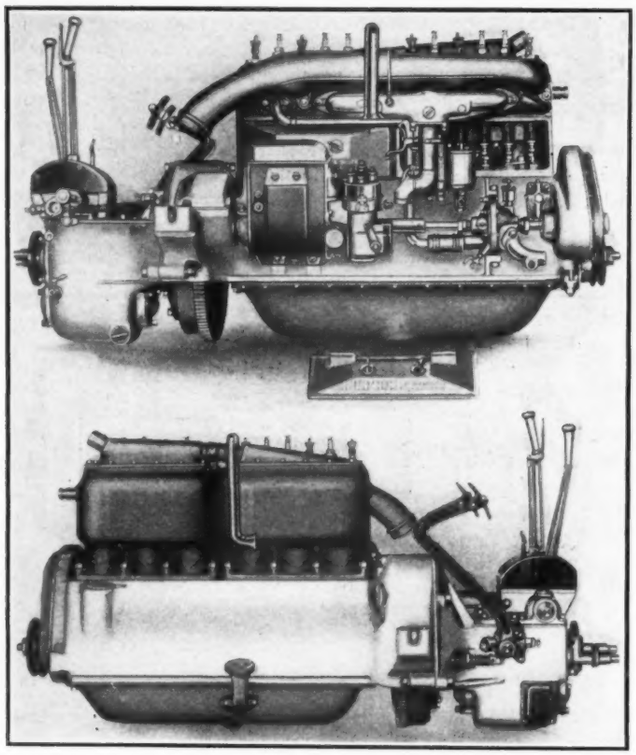
A NEW principle for carbureters has been recognized by the German Patent Office in the so-called Inhalator designed by Bucherer. It is made, or to be made, in different models, and the principal parts of one of these are shown in Fig. 4. The object of the construction is to provide a fuel feeding method equally well adapted for all fuels under consideration for automobile motors and for motors of any number of cylinders. The construction is described as follows, with reference to the illustration.

Cold atmospheric air enters at *a* and heated air at *b*. The jet *f* is connected with float chamber *g* and the jet *k* with the atmosphere. A tube *r* connects the float chamber *g* with the suction conduit of the carbureter, so as to equalize the atmospheric pressures in these two spaces. The fuel is not, as usual, drawn from jet *f* by the suction in a Venturi tube but by the siphon action of the air jet *k* which operates exactly as a florist's atomizer or a locomotive injector. The fuel therefore wells slowly out of *f* and is then carried forward and atomized in the air current from *k*.

On the cover of the float chamber there is arranged an air valve *l* which as a rule is closed but can be opened in order to adapt the carbureter to a different fuel or a change of climate. The principle involved in this provision is that, when this valve is opened a trifle, a little air enters in the float chamber and, while it is almost at once drawn away through the tube *r*, the passage of this air nevertheless causes a slight increase in the

(*Continued on page* 886)



Hudson six-forty, showing arrangement of piping, carbureter, pump and generator. Notice new flywheel housing

New Hudson Small Six

Cylinders 3.5 by 5 Inches
Weight Under 3,000 Pounds
Delco Electric System Used

FURTHER emphasizing its conversion to the manufacture of sixes exclusively, the Hudson Motor Car Co. this week announces an entirely new and lighter six-cylinder model, Six-40. Instead of in January, the shipments of this newest model, which for 1914 will be the running mate of the model Six-54 already submitted to the public, will begin in December.

This new six is to sell for $1,750 in roadster and phaeton models. And with a total phaeton weight of 2,940 pounds with tanks filled, or about 18 pounds per inch overall. It weighs only 200 pounds more than the Hudson 33, a four-cylinder, 1912 model, yet has a wheelbase of 123 inches—7 inches longer—has 30 per cent. more power, larger carrying capacity, to say nothing of the two extra cylinders, electric cranking and lighting equipment and so on.

In fuel consumption, too, this new Six-40 is said to run more miles per gallon than an equal-powered four, according to actual tests. Fourteen to 17 miles per gallon of gasoline is claimed

Streamline Body Effect

The Six-40 has practically the same type of streamline appearance as the Six-54, although a change in radiator shape has been made. The top of the radiator is rounded and there is no sharp corner where the vertical sides meet the top section.

Another distinctive touch is given the radiator by the coping-over of the front edge. The cowl slopes to the hood with a slight, sweeping curve, and like the larger six, the gasoline tank is carried under it. On this car, like on the larger six, there are no sidelights, special resistance being provided so that the headlights may be dimmed for city driving.

But although the Six-40 is very similar in outward appearance to its larger brother, it presents many mechanical chassis features which are decidedly different, several of them being entirely new to Hudson design. Throughout the Six-40 chassis a marked simplicity of design and absence of complication is noticeable. There is no "mussiness" about the job, and every part looks to be designed to mate with its adjoining parts, no after-thought features being found.

L-Type Motors Used

The motor, 3 1-2 by 5 inches, is rated at 40 horsepower, but develops 47 horsepower easily, it is claimed. The cylinders, cast in threes, are L-head with valves on the right. The gearbox bolts to the rear of the power plant, making a unit construction, the front end of the motor being carried on the front frame cross-member, while integral crankcase arms pass to the side-frame rails at the rear. Since there are two supporting lugs—one at each front corner of the crankcase—which rest on the front cross-member, the motor is four-point supported.

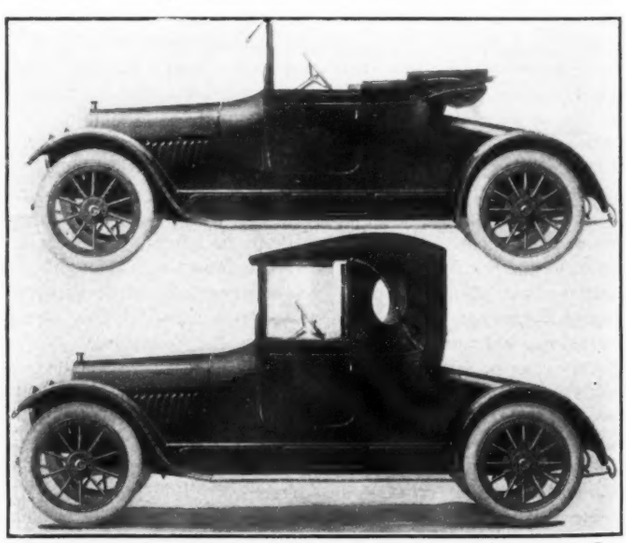
A noticeably new power plant design feature is the partial housing in of the flywheel. Heretofore a characteristic of Hudson motors has been the exposed flywheel construction with yoke arms integrally cast with the crankcase encircling the flywheel, these arms forming the motor supports at either side and the gearbox bolting to their rear, but in the new six a bell housing which is a part of the upper half of the crankcase partially incloses the flywheel, while a pressed steel pan underneath finishes the job.

The engine reciprocating parts are made as light as possible to be consistent with their necessary strength, and in this manner vibration is reduced to a minimum. The pistons are gray iron, annealed, ground and lapped into their cylinders; they carry nickel-steel hollow wrist-pins which are pressed into place and held by a set screw; the connecting-rods are of special heat-treated steel of I-beam section, and their bearings are of nickel babbitt; the bearing caps at the lower ends are held in place conventionally by castle nuts of nickel steel, and shims are provided which make adjustment easy.

Balancing of Crankshaft

The crankshaft, with three main bearings, has the arms or throws of such shape that a perfect balance is said to result at all speeds. The bearings are all of very liberal size, as will be evident from the motor dimension table.

The camshaft, of large size, has integral cams, which are ground to give an inlet valve opening of 9-32 inch and an exhaust opening of 11-32 inch. The camshaft operates on three nickel-babbitt bearings like the crankshaft, and is driven by



Hudson six cabriolet with top in raised and lowered positions

helically-cut timing gears of heat-treated steel. These gears are housed at the front of the motor by a pressed-steel cover plate, which is rather a departure from the aluminum case ordinarily used.

To the mechanically inclined motorist, these motor dimensions will be of special interest:

Crankshaft bearings:
Front—2 3/16 inches diameter; 2⅞ inches long.
Center—2 7/32 inches diameter; 2½ inches long.
Rear—2¼ inches diameter; 3 inches long.

Connecting rod lower bearing:
1⅞ inch diameter; 2 3/16 inches long.

Camshaft bearings:
Front—2 19/32 inches diameter; 1½ inch long.
Center—2 /916 inches diameter; 1⅜ inch long.
Rear—1½ inch diameter; 1¾ inch long.

Valves (Interchangeable):
Diameter—1 11/16 inch.
Clear opening—1½ inch.
Lift—Inlet, 9/32 inch; exhaust, 11/32 inch.

Stamping in Crankcase

Although the top half of the crankcase is of aluminum and carries the three crankshaft bearings in conventional manner, the lower half is a steel stamping and removable without disturbing the bearings. This part also carries the oil reservoir, and since the car carries no mud pan, is exposed, thus cooling the oil and insuring better lubrication, it is said. The lubrication, of the constant-level splash type, adheres to Hudson principles, the oil being fed into the connecting-rod troughs by a plunger oil pump operated by the camshaft. An oil-level gauge is provided on the left side of the oil pan, while an oil filler is an integral part of the left front side of the crankcase. A pressure gauge is on the dash. As with the larger motor, this engine has oil breathers which are a part of the valve cover plates, taking the place of breather pipes on the crankcase. The breathing takes place through the tappets, which gives the advantage of oiling these tappets by the breathed oil.

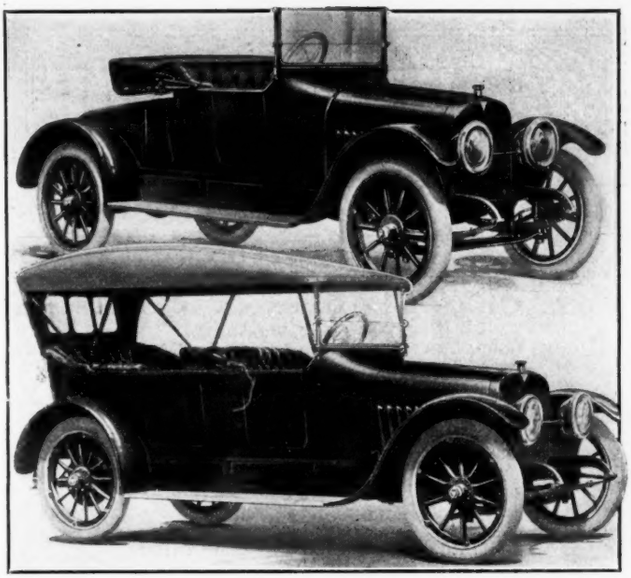
Due to the location of the gasoline tank in the cowl, giving positive gravity feed, the carbureter is located high on the right side of the engine so that the inlet manifold has practically no vertical pipe whatever. This greatly reduces the resistance to the passage of the gases to the cylinders and at the same time makes the Zenith carbureter accessible. The carbureter has an adjustment for low speed as well as a strangler and control for hot and cold air. Dash adjustment is also provided.

The Six-40 uses Delco combination lighting, cranking and ignition, as does the Six-54. The combination motor and generator with which the ignition distributer is an integral part is located on the right rear close to the flywheel. When operating as a generator the unit is driven from an extension of the pump shaft at 1.25 times crankshaft speed. When running as a motor to crank the engine it drives through a train of gears housed within the right arm of the crankcase, which mesh with teeth in the rim of the flywheel. There are two reductions in this gear train which result in a ratio of 23 to 1 between engine and motor, and when not operating to turn the crankshaft no gears are in mesh, eliminating any possibility of noise. A cover plate over the housing of these starter gears makes their inspection an easy matter.

An Exide, 100-ampere-hour storage battery carried under the left front seat is a part of the electric system. Provision is made for the direct lighting of the lights from the battery at night when the generator is not operating. The total weight of the electric unit is 60 pounds.

Delco Cranking Control

The cranking control is very simple. After the ignition current has been switched on it is only necessary to press the foot on the small pedal at the left of the gearshifting lever in the center of the car. This meshes the gears and sends the current to the electric motor, which spins the engine at from 80 to 100 revolutions a minute. The generator begins to charge the battery below 300 revolutions a minute, and reaches its maximum output at from 15 to 18 miles an hour car speed.



Showing the body lines of the New Hudson six runabout and phaeton

No change is evident in the clutch design on this new Hudson. It is a multiple-disk type contained in an oil-tight case in the flywheel. Back of it is the three-speed gearset, the case of which has been so designed that all parts are accessible. Roller bearings are used.

Gearshifting and brake levers are mounted on top of the gearbox, which marks a departure from former Hudson design. The larger Six-54, it will be remembered, has its control levers mounted back of the gearbox and on frame cross-member. The brake and clutch pedals are carried on a bracket off the left side of the gearbox.

Hotchkiss Type of Drive

The drive of this new six is also entirely new to Hudson cars. The so-called Hotchkiss drive which eliminates both torsion tube and torsion arms is incorporated and makes for extreme simplicity of construction. The drive is taken through the rear springs by this system, and to accommodate this the master leaves of the two rear springs must necessarily be made somewhat heavier. The drive shaft, with a Spicer universal joint at either end, is not of the same sectional diameter from end to end as is found in nearly every car now built, but tapers from a diameter of 1 3-4 inch at the center to 1 1-4 inch in diameter at the ends. This varying section has been used in order to stiffen the shaft against any whipping action which might take place in an ordinary shaft of its length—64 inches. Such vibration or whipping might assume great enough proportions to snap the shaft.

As on the Six-54, the three-quarter elliptic rear springs are underslung from the axle, giving a lower hanging of the chassis without altering the road clearance. These rear springs are attached directly under the sideframe rails so that there will be no tendency to twist the side member. One clip loops over the rear cross-member at the outer end, while the inner is held by a bolt. This attachment is very rigid. Spring bolts are all equipped with grease cups to lubricate the bronze bushings. The springs are 2 inches wide, and the rear ones measure 54 inches and the front 39 inches long.

Tapered Frame Designs

Like the bigger six, this has a tapered frame, a distinctive Hudson feature. Instead of the bottle-necked design, this frame begins to taper at a point 50 inches from the rear, narrowing

(*Continued on page* 887.)

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Stock Car Contests

TWO or three leading makers of automobiles are at present considering the advisability of competing in contests next year, although they have been out of the contest field for 2, and in some cases 3 years. These concerns are frank to acknowledge that the merit of contests is not all past, and further that the industry is suffering considerable loss today because of the lack of publicity to the daily and weekly press which it received in the days when contests were at their height.

It is particularly logical that such a turn in contest affairs should come about in these days when the program of European manufacturers is being watched so closely. The eyes of the world are centered on France where the small, high-efficiency motor has been developed at a rapid rate. France is going more and more into contests than ever before. During the last 2 years she has supported road-racing, and the past year has witnessed a pronounced revival in reliability contests. Her 1914 program, already mapped out, shows searching reliability contests for small cars as well as large ones. The rules for these are more severe than any in the past. Stock vehicles will compete and all parts will be protected by seals so that the utmost accuracy in results will be obtained.

Looking To Maintenance Cost

These new rules point strongly to greater recognition being taken of maintenance cost, and for the first time tires will be stamped and gasoline and oil carefully handled. In a word, these new contests are, as they should be, intended to take due recognition of the cost of car operation. French makers realize that the permanency of a certain buying clientele depends upon the relative economy of the machines, and the makers expect that these public demonstrations will convince a good percentage of a disinterested fraction of the population, that the cost of operating a car is not prohibitive; and these makers are further determined that they will present to the public a full and complete statement of facts concerning reliability and operating costs.

The policy of dividing contesting cars into two divisions is an excellent one, in that people interested in small cars are rarely interested in large cars, and you only have meaningless and damaging results when you put the small vehicle in competition with the large vehicle. These two types of machines appeal to entirely different classes of owners, and consequently comparisons between them would not only prove useless but actually damaging.

The Accessibility Clause

France could go one step further in her tests of small and large cars, namely, in the matter of accessibility. After the road test is over and after the inspection of the chassis parts has been completed a test of the accessibility of many parts could be conducted. In such a test the time required to remove and replace certain parts could be discovered by the actual removal and replacement of these parts. This time should be converted into points penalty on the dollar-and-cent basis. Such an accessibility contest might incorporate removing and replacing of the magneto, retiming of same, removing and replacing carbureter, inserting a new valve spring, adjusting the clutch, tightening fan belt, adjusting brakes, and a score of other adjustments or replacements which the car owner frequently has done in a garage and for which he pays according to the length of time required, his bill often being geater for the time consumed in removal and replacement due to a lack of accessibility than in payment for the actual work of repair or adjustment.

Such an accessibility contest would appeal particularly strong to the buying clientele and would result in the concentration of the engineering department on accessibility, which must be considered when car maintenance is brought into the dollar-and-cent column. The length of time required to adjust a set of brakes varies in proportion to the accessibility of these adjusting features. With not a few American cars brake adjustment is a repair shop job consuming from one-half to 1 hour, whereas there is no reason why hand provision could not be made for brake adjustment, making it possible for the owner to do the work in a very brief time. Such rules apply in greater force to the small car in which the owner, in the majority of cases, is the driver, than with the large car where the chauffeur is employed. It is nevertheless a fact today that many owners of large cars driven by chauffeurs are objecting to the excessive garaging and repair bills, a part of which is due, in some cases to the deplorable lack of accessibility of parts. There are almost innumerable examples of where chauffeurs cannot, with the ordinary garage equipment, accomplish simple adjustments and repairs, due to the inaccessibility of the parts.

A recent example of inaccessibility of parts was that of a leak in a gasoline tank which required but 3 minutes soldering work, but before this could be done the body of the car had to be taken off, requiring over 1 hour to remove and replace the body and but 3 minutes to do the soldering. This is an extreme example of what inaccessibility costs the car owner, but there are many other equally extreme ones. There are cases of where a magneto has to be removed before a valve spring can be changed, where the mud apron has to be taken off before the carbureter can be removed, and others where the steering gear must be loosened on the frame before certain motor parts can be reached.

Contests that will draw attention to such glaring examples of inaccessibility will be welcomed by car owners, and these contests will turn the attention of the engineering and merchandising departments of the factory to the imperative need for greater accessibility.

Implied Warranty Survives Acceptance of Goods

So Court Holds in Case of the Marx Company vs. Locomobile Company Regarding Asphalt-Damaged Truck

NEW YORK CITY, Nov. 5—A very interesting case has been brought up in the City Court, Trial Term, in which action is brought by the Marx Co. vs. the Locomobile Co. of America, to recover the purchase price of a truck ordered by the defendant from the plaintiff. The order was in writing, and provided for the manufacture of a certain type of wagon designated in a catalogue issued by the plaintiff as "type 18," and contained certain particular specifications as to the lining of the body with asbestos and extra steel plates. The truck was delivered to the defendant's customer. The truck was to be used to carry asphalt, and the purpose of its use was made known to the manufacturer. After being in use for some time it appears from the evidence on the trial that it worked unsatisfactorily for a number of reasons, the chief among which being that the heat of the asphalt caused in some way the iron to warp, and consequently that the carriage or body of the truck would not work properly, and that the iron channels became out of order and necessitated the employment of a number of men to lower and raise the body of the truck when it was required to unload the wagon.

Motion Is Now Before Court

The case came on for trial and upon the facts in the case a verdict was directed for the plaintiff. A motion was thereupon made to set aside the verdict, and this motion is now before the court. Whatever rights the respective parties to this action may have must be determined under their contract and the Sales Law, being sections 82 to 158 of the Personal Property Law, chapter 571, Laws 1911. Section 96 of that law provides, "there is no implied warranty or condition as to the quality or fitness for any particular purpose of goods supplied under a contract to sell or a sale except, 1, where the buyer expressly or by implication makes known to the seller the particular purpose for which the goods are required, and it appears that the buyer relies on the seller's skill or judgment, whether he be the grower or manufacturer or not, there is an implied warranty that the goods shall be reasonably fit for such purpose."

Implied Warranty Assumed

It appears that the Court is satisfied, taking evidence into consideration, that there was an implied warranty, that the wagon should be reasonably fit for the purpose of carrying asphalt, and the purpose for which the truck was desired was made known to the manufacturer. At common law, the acceptance of the goods when they did not correspond to the implied warranty or condition destroyed the implied warranty, and it did not survive acceptance unless the defects were latent. The question is now whether the Sales Law, so called, has changed the common law rule that an implied warranty does not survive acceptance. Section 130 of the Sales Law provides that the acceptance of the goods must within a reasonable time give notice to the seller of the breach of any promise or warranty, otherwise the seller shall not be liable. The Court claims that at no time, in its review of the case, was there a suggestion made to return or an offer to return the truck; and so too, there was never any suggestion of a rescission of the contract or an offer to return, either in a good condition or as deteriorated by usage due to the breach of warranty; but on the contrary, defendant's own testimony conclusively establishes the fact that notwithstanding the alleged breach of warranty the truck was retained and used in the business of the defendant's customer because it was necessary for them to carry out certain contracts which they had for the delivery of asphalt. The Court holds that under the Sales Law, the common law has been changed and an implied warranty now survives acceptance of the goods, and, furthermore, that the direction of a verdict in favor of the plaintiff was right and should not be disturbed. The defendant may have 10 days' stay and thirty days to make a case after entry of judgment and notice thereof.

More Drawback Allowances Made

WASHINGTON, D. C., Nov. 4—*Special Telegram*—Among the first drawback allowances granted by the treasury department under paragraph O of section four of the tariff act of October 3, 1913, and drawback regulations of June 16, 1911, were these:

On motor car rear axles manufactured by Timken Detroit Axle Co. with use of imported driving worms and worm gears. On electric generators manufactured by the Remy Electric Co. with use of imported ball bearings for the account of Reo Motor Car Co. and on motor cars manufactured by the Reo company with use of such generators. On model P Studebakers manufactured by Studebaker Corp., with use of aluminum parts made from castings manufactured from imported aluminum for their account by General Aluminum and Brass Castings Co., Detroit, when exported either separately or in connection with other parts of model P automobiles.

S. A. E. Broaches Division Meets

NEW YORK CITY, Nov. 5—The Broaches Division of the Standards Committee of the Society of Automobile Engineers held a session this morning, the following being present: C. W. Spicer, chairman; R. R. Lapointe, F. L. Everhardt, J. S. Barr, W. S. Zimmerman and J. W. B. Pearse. The purpose of the meeting was to draft a report for the winter meeting of the Society to be held in January.

WALKERVILLE, ONT., Nov. 1—Walkerville, Canada, will have another automobile factory early next year in the Fisher Automobile Co. recently formed, with Frank Fisher, formerly general manager of the Walkerville branch of the Studebaker plant, as president. The new company has purchased the Tudhope Automobile plant in Orillia, which has been shut down several months. The plant is to continue work at Orillia until January 1st, when the workmen will be transferred to Walkerville. Several hundred men were employed at the Orillia plant.

S.A.E. Divided on Definition of Cyclecar

Discussion Shows Diverse Opinions as to Cyclecar's Future—The Small Automobile Most Favored Type

NEW YORK, Oct. 30—Betwixt and between is the cyclecar field in America, if deductions may be drawn from papers read and discussions participated in on the subject of cyclecars at to-night's meeting of the Metropolitan Section of the Society of Automobile Engineers; the boundaries of the betwixt-and-between zone are the motorcycles on one side and the small automobiles on the other, but the cyclecar will not be a parasite according to opinions expressed tonight. In other words, it will not destroy the motorcycle field, neither will it encroach on the small automobile field, but there remains between these a great field of demand by people who refuse to dress as needed on a motorcycle and expose themselves to the dust, mud and grease on one hand, and who cannot afford the maintenance cost and garaging cost of small automobiles on the other.

Tonight's meeting contained several doubting Thomases, those who feel that the manufacturers of small cars today can if necessary further reduce prices and kill out cyclecar competition; and who further believe that you cannot build a good cyclecar patterned after motorcycle constructions and with motorcycle efficiency that can sell for less than $500.

It is questionable if ever before in the history of the Metropolitan Section there has been such a diversity of opinion expressed on any matter as were given vent to at tonight's meeting. One minute a motorcycle representative was decrying the cyclecar on the grounds that it cannot travel on the rough roads between ruts, on the grounds that belt transmission are useless and on the grounds that motorcycle motors cannot be used satisfactorily in cyclecars; and the next minute an enthusiastic cyclecar representative saw endless green fields awaiting the advent of this new vehicle of transportation.

Much division of opinion existed on what constituted a cyclecar and the diversity of opinion was well shown when a vote was asked to decide a definition for American cyclecars, which was overwhelmingly defeated. The word cyclecar today stands for two types of vehicles, a small motor car with four-cylinder motor, flywheel clutch, sliding gearset, bevel rear axle and fitted with top, windshield, lamps and horn; and on the other hand a light vehicle with motorcycle engine, belt or friction transmission and without top, windshields, and other luxuries, but having two passengers seated either side by side or in tandem.

Alden L. McMurtry took the stand that the best type of cyclecar would be one developed from the motorcycle and combining all its merits of design, construction and materials, but that such a machine could not be built under $500, a price which would bring it into direct competition with small cars of today. There were many who opposed his views, but all agreed that those who buy cyclecars will be led to their conclusion by low cost of gasoline, tires, oil and garaging maintenance, rather than low initial cost. It was pointed out that often vehicles of low initial cost are costly to maintain and that cyclecars built along such lines would lead to business suicide.

The following extracts from addresses given show the general trend of feeling:

American Cyclecar Idea

American makers are not disposed to take kindly to cyclecars due to the flimsy appearance of foreign types particularly many of the English makes. There is, however, a field and demand for the cyclecar, which lies between the conventional light car of today which is too heavy and the motorcycle which is not suited to comforts of travel which many demand. True the side car attachment has added to the comforts of the motorcycle but it still leaves the driver exposed to cold and vibration.

The eventual American cyclecar will be different from the English cyclecar, in fact it will be a small motor car with top, windshield, mudguards, lamps. It will be well built from stem to stern.

In the cyclecar field first cost together with consumption of gasoline, oil and tires must come in for first consideration. It is possible to manufacture such a vehicle and call it a cyclecar and when it comes, the motor car and motorcycle will retain their present places. The cyclecar will be owned by the man who owns a motor car but who wants a cyclecar for business purposes. There are thousands of such people waiting.—Paper read by R. R. Adams for Mr. Harry J. Stoops, of the American Cyclecar Co., Bridgeport, Conn.

Special Motors Needed

We judge of the future from the experience of the past, and our experiences of the past year in cyclecar manufacture have proven that the cyclecar has a particular field of its own and calls for a particular design of its own. Our first efforts in adopting motorcycle motors to a cyclecar was disappointing and we found we had to build our motor to suit cyclecar conditions.

We have driven our cars over many thousands of miles of road in Illinois, Indiana and Michigan and cannot find any roads that give difficulty to the narrow tread cyclecar.—W. H. McIntyre Co., Auburn, Ind.

Want Real Small Car

For the eventual American cyclecar we have no faith in two-cylinder air-cooled motors chain drive or planetary gearsets, but favor a four-cylinder water-cooled motor, sliding gearset and bevel type of rear axle.

The present objection of the American people to the cyclecar is its size, the public wanting a slightly larger runabout type with passengers seated side by side in preference to tandem seating.—American Motor Co., Brockton, Mass.

Bright Cyclecar Future

Few people realize the extent to which a cyclecar will take hold in this country. There is a good future for a good cyclecar. At present a great demand for some efficient type of vehicle exists and we know of nothing better that will fill this niche than the cyclecar.

A satisfactory cyclecar must be a light vehicle carrying passengers seated side by side, and having considerable speed. The ultimate type will be a small automobile, selling between $500 and $600. It will be a regular automobile as seen through the big end of a field glass. It will have every equipment including lamps, top, windshield, four wheels, and made from the best of materials. The four wheel support is much preferable to three-wheel. The tread must be narrow; wire wheels used because of lightness and strength; seats placed side by side; the motor a four-cylinder, four-cycle water-cooled type; the gearset a sliding one with two forward changes; 32 by 3.5 or 3-inch tires and a bevel rear axle. Such a little vehicle will not have any effect on the present motorcar and motorcycle business, but will develop a field not satisfied with the present extremes, the motorcycle in one hand, the expensive car in the other.—J. K. Merkle.

No Faith in Cyclecars

The cyclecar is only a passing fad and has no future, our roads making their use impossible. Up to the present it has failed to establish itself in England where it is trying hard but meeting with little success. In a recent endurance run in Scotland, motorcycles made a particularly favorable showing, where the cyclecars showed poorly.

Today the motorcycle is preferred by those people who want a high efficiency instrument of travel. Cyclecars selling at the same price as the Ford will meet with very little success. Many makers have already found their mistakes in cheap cyclecars, the V-belt being one. When it slips enough to give satisfactorily differential action it will not give satisfactory driving for straight ahead work and vice-versa. Designers have tried using light, air-cooled motorcycle motors, but experience shows that these are not satisfactory for cyclecar service. The satisfactory cyclecar will have to use a differential.

A serious objection to the cyclecar is that with 36-inch tread it is difficult to hold it between the ruts on a rough road, and in wet weather this part of the road is very soft and calls for 500 per cent. more power to drive it. The driver sits too low in a cyclecar, being in the zone of all the dirt thrown by other vehicles.—T. J. Baile, Consolidated.

Favors Belt Drive

There has been a big demand for smaller motor cars for several years, and there is unquestionably a demand today for good cyclecars, but unfortunately so many of the so-called cyclecars of today, which in many cases are only on paper, should be called small cars. By the spring of 1914 there will be, on our roads, many cyclecars using motorcycle motors and belt drive, but without clutch or gearset. We must have few parts in the cyclecar and consequently friction transmission in some form is ideal, both because of its simplicity and its ease of operation. What is needed is a friction set giving direct drive on high without slipping and yet affording the necessary variations on all other speeds. Belt drive is quiet and preferable to chain. The cyclecar if well worked out will be a big business getter.—Fraser Co. of Illinois.

High-Grade Type Needed

The cheapest motor vehicle in the world is the motorcycle, for the transportation it affords and next to it is the cheap motor car. The modern motorcycle is little understood; it is often considered a rough riding vehicle, yet it rides as easily as the rear seat of the motor car and requires but 50 miles, experience to learn to ride.

Cannot a motorcycle be made with four-wheels, a two-passenger body and is it necessary to follow conventional car progress in building such a machine? If a cyclecar is designed in accordance with a high standard of practice shown in motorcycle building it cannot be sold under $500. A good motorcycle with side car attachment sells for $350 to $400.

The motorcycle maker has brought his business to as high a standard of perfection as the modern builder of motor cars.

At present 80 per cent. of the cyclecars built in America are designed to be in competition with our cheapest motor cars, and merchandising difficulties will be sure to follow this trend. The cyclecar motor being small in proportion to the load it has to carry will have to be a very efficient motor, one of the highest possible construction. A good method of bringing about cyclecar improvements will be a stringent program of stock cyclecar races.—A. L. McMurtry.

Cyclecar Features

There are approximately 50 makers of cyclecars in England, 27 of whom are really manufacturing cyclecars, the remainder building small motor cars selling around $1,000.

At present in England there are two classes of cyclecars, the larger with a maximum weight of 784 pounds and a piston displacement of 1,100 cubic centimeters; and tires not less than 2⅜ inches in section. The small class of cyclecars has a weight range of 330 to 660 pounds, a piston displacement of 45.7 cubic inches, tires not over 2 3/16 inch section and carry clutch and chain speed gearset.

Some of the highest price small cars or cyclecars in England sell at $935, but the average price is approximately $570. The average weight of these little vehicles is 500 pounds, the maximum weight of any machine being 784 and the lightest 280.

Thus far the British cyclecar is largely an assembled proposition. Ninety per cent. of them use air-cooled motors. There are eleven concerns using twin-cylinder motors, two concerns using four-cylinder and only one using the single cylinder type. Magneto ignition is used on all. Fifty per cent. have belt transmission; 52 per cent. use a three-speed gearset; 35 per cent. two-speed gearset. Ten machines are fitted with a flywheel clutch; eight of which use a cone type, the remainder multiple-disk types. Final drive by single chain is used on three makes. One concern uses a single flat belt.

In frame construction the tubular type leads. The field of spring suspension shows 54 per cent. using the standard semi-elliptic automobile type. Double brakes on the rear axle are favorites. The most popular steering is by rack and pinion. Forty-inch treads are used by one-third of the makers and on the remainder of the cars the range is between 40 and 48 inches. There is only one make using a wheelbase of 90 inches. The most popular sizes are 650 by 65 millimeters or, 23⅜ by 2¾ inches for tire equipment.

You cannot take two motorcycles and make a cyclecar. The original cyclecar was so made, but the modern cyclecar is nothing like it. Beginning from the bottom you must keep your weight low, having the center of gravity in the plane of the axle and doing this keep the clearance as high as possible. You have in the modern cyclecar a vehicle that will hold the road particularly well at all possible speeds and under adverse road conditions. In the ideal cyclecar we must have a stream line body, the shape of the body aiding in holding the vehicle to the ground and permitting of attaining high speeds with low expenditure of gasoline and tires. I agree that the cyclecar should be an automobile as seen through the big end of a telescope. There is today a tremendous field for cyclecars if properly designed and properly built, but those who market a clap-trap type of vehicle will soon be out of business. For one person who will ride a motorcycle there are 10,000 who will ride a cyclecar.

English tests have shown that cyclecars can average over 60 miles per gallon on fuel. You can run at speeds of from 30 to 50 miles per hour, from 40 to 60 miles to the gallon. This is being done every day in the week. Your tire expense on these same machines is low. The tires cost $8.00 each and will endure for 8,000 to 10,000 miles. This is not imagination, but is actually being accomplished in England where the cyclecar is a tremendous success.

The spring suspension in a cyclecar is entirely different from that in an automobile, and I think the long cantilever type is the only one that will give success. It is a very sensitive spring and is free from the rebound tendencies of the motor car spring. Belt drive is not mechanical and will not be used very much.—Irving Twombly, Twombly Motors Co., New York.

There are thirty-four cyclecar makers in America today, many of whom have only partly completed machines, and several are freakish designs owing to the companies making them being dictated to by freakish engineers. It is a safe prediction that 90 per cent. of the present cyclecar makers will not be in existence 2 years hence.

10-Year-Old Cadillac Makes Fine Showing in English Test

LONDON, ENG., Oct. 30—The test of the old 1903 Cadillac car was put through when it entered for a R. A. C. observation trial was successful. The car not only ran through the 100 miles, but covered over 1,000 miles. Seventeen and a half hours were occupied in executing repairs and carrying out adjustments, but a large lot of overhauling was expected as the car was bought from a private owner and without any attention entered for the trial. During the 8 days it averaged 11.169 miles per hour.

Holding Up Jersey Motorists

NEW YORK CITY, Oct. 31—Motorists beware! The state authorities in New Jersey have sent out inspectors in search of those motorists who go without their drivers' licenses. On Sunday last, fully 100 automobiles from Connecticut, New York and New Jersey were held up on the Montclair hill, and forced to show their licenses. Needless to say, there were many fines.

New Bosch Distributors Appointed

NEW YORK CITY, Nov. 3—The Bosch Magneto Co., of this city, has appointed the following concerns as its distributors: Bertram Motor Supply Co., Salt Lake City, Utah; Schuman Carriage Co., Honolulu, T. H. The following supply stations were appointed: T. M. Caldwell, Amarillo, Tex.; Charles Arnholm, Barre, Vt.; A. R. Rettinghouse, Centralia, Ill.; Electric Service Co., Dallas, Tex.; Robert R. Ashwell, Hartford, Conn.; Bering Tire & Rubber Co., Houston, Tex.; Andrew Cowan & Co., Louisville, Ky.; The Manley-Wilkins Co., Mt. Carmel, Ill.; Tire Trading Co., Newark, N. J.; J. M. Hubbard & Co., Norfolk, Va.; Tiffany Diamond Garage, Poughkeepsie, N. Y.; H. G. Guenther, San Antonio, Tex.; Wyckoff-Cord Auto Co., Sioux City, Ia.; Child, Day & Churchill, Spokane, Wash.; The Motor Shop, Trenton, N. J.; Tri-State Supply Co., White Plains, N. Y.; P. N. Montague Garage, Winston-Salem, N. C.

Will Handle S. & M. in New York

NEW YORK CITY, Nov. 3—The Dimond-Warren Motor Co. has been formed for the purpose of selling the wholesale and retail trade in this city, and surrounding territory the S. & M. automobile, built in Detroit, Mich. Thomas Dimond is president. J. Renwick Dimond is treasurer and A. C. Warren, secretary and general manager.

MONTREAL, QUE., Oct. 31—At last Prince Edward Island allows motor vehicles to be operated in Charlottetown Royalty and on the Union Road, and within the limits of the Town of Summerside on Monday, Wednesday and Thursday. The Royalty comprises an area of about 4 miles east, west and north of Charlottetown, and Union Road covers a distance of 17 miles, and by it motorists may reach the Cliff Hotel and Mutches Hotel at Stanhope, which are both on the north shore of Prince Edward Island.

Rajah Supply Files Suit

Injunction Against the Rex Ignition Co. for Infringement of Spark-Plug Patent

NEW YORK CITY, Oct. 31—A permanent writ of injunction has been filed in the United States District Court of the Southern District of New York by the Rajah Auto-Supply Co. against the Rex Ignition Mfg. Co., for the alleged infringement of certain spark plug features, in patent No. 825,856. This company, it will be remembered, brought suit against the Emil Grossman Co., of this city, some time ago, and the suit was awarded to the defendant, on June 16 last, because that company had proved that it did not make it a business to sell porcelains, which was the claimed infringement, particularly for the complainant's spark plug. The complainant claims now that the Rex Ignition Mfg. Co. infringed by selling various porcelains not sold by complainant, but which it claimed could be substituted in the patented Rajah spark plugs in violation of the said license restriction.

Brown & Sharp Petition Granted

NEW YORK CITY, Nov. 3—The petition of the Brown & Sharp Mfg. Co., praying for the release, cancellation and discharge of the lien of the receivers upon certain funds now on deposit to the credit of the Maxwell Motor Co., Inc., has been granted. It will be remembered that recently an order was entered authorizing the sale of the different properties held by the defunct U. S. Motor Co. An order was granted to the receivers, wherein the property of the Columbia Motor Car Co. in Hartford, Conn., was to be sold for $25,000, and the property of the Dayton Motor Car Co., at Dayton, O., was sold for $49,085.53. Now, through the petition of the Brown & Sharp Mfg. Co., the sales of these two properties have been modified so as to release and cancel the lien of the receivers to the said sums and the whole thereof. The following statement gives the exact amount of money derived from the sales of the different properties:

		On deposit Oct. 29, 1913
Committee accounts	$286,233.14	
Receivers' funds	135,688.95	
Maxwell Motor Co. special account	74,085.53	
Total	$496,007.62	
Subject to:		
Cash proportion of 21 claims allowed by special master	(24,605.25)	$6,151.29
Claims disputed:		
Carlson Motor Truck Co.		500,000.00
Columbus Circle Realty Co.		137,410.56
Total		$637,410.56
Claim in course of adjustment:		
Muskegon Motor Specialty Co.		1,386.59

To Sell Ohio Falls Motor Co.

LOUISVILLE, KY., Nov. 1—By order of Judge W. C. Utz, of the Floyd County Circuit Court, the plant of the Ohio Falls Motor Co. in Vincennes street, New Albany, Ind., has been advertised for sale by Joseph Bruns, receiver for the company. The sale, which is on a decree in a receivership suit of Ferdinand Kahler against the concern, will be held on November 26. The sale is subject to the following liens: A mortgage in favor of the Louisville Trust Company amounting to $22,835; sewer assessments aggregating $90.02; street improvement assessments aggregating $273.65, and taxes aggregating $2,357.75.

The property, which includes 6 acres of ground and half a dozen brick buildings, together with the machinery for the manufacture of automobiles, was bid in by members of the company at a receiver's sale several months ago, but the purchasers failed to consummate the purchase. This fact was reported to Judge Utz and he ordered the property re-sold.

National Truck Out of Business

CLEVELAND, O., Nov. 1—The National Motor Truck and Manufacturing Company of Gibsonville, O., organized recently, has ceased business. Frank Lamb, who severed his connection with the Gramm Motor Truck Co., of Lima, to become general manager of the National company, is considering new offers.

Automobile Securities Quotations

No changes of any importance occurred in this week's automobile securities quotations. Most all of the prices stayed within a point or two of last week's quotations.

	1912 Bid	1912 Asked	1913 Bid	1913 Asked
Ajax-Grieb Rubber Co., com.	170	200	150	..
Ajax-Grieb Rubber Co., pfd.	97	100	94	100
Aluminum Castings, pfd.	100	102	98	100
Chalmers Motor Company, com.	..	..	..	98
Chalmers Motor Company, pfd.	..	..	..	96
Consolidated Rubber Tire Co., com.	11½	15	34	37
Consolidated Rubber Tire Co., pfd.	50	55	90	96
Firestone Tire & Rubber Co., com.	280	285	260	270
Firestone Tire & Rubber Co., pfd.	105	107	102	103½
Garford Company, preferred	99	101	85	90
General Motors Company, com.	34½	35½	37	38½
General Motors Company, pfd.	77½	78½	76	78
B. F. Goodrich Company, com.	70	71	20	21
B. F. Goodrich Company, pfd.	107	107½	87	88
Goodyear Tire & Rubber Co., com.	385	390	270	278
Goodyear Tire & Rubber Co., pfd.	104½	105½	97¾	98½
Gray & Davis Co., preferred	..	..	96	102
Hayes Manufacturing Company	..	90	..	..
International Motor Co., com.	19	21	..	5
International Motor Co., pfd.	74	76½	10	15
Kelly-Springfield Motor Truck Co., com.	..	..	50	60
Kelly-Springfield Motor Truck Co., pfd.	..	..	90	101
Lozier Motor Company, com.	..	..	15	..
Lozier Motor Company, pfd.	..	..	..	92
Maxwell Motor Co., common	..	..	2	2½
Maxwell Motor Co., 1st pfd.	..	..	18	21
Maxwell Motor Co., 2nd pfd.	..	..	4¾	6
Miller Rubber Company	135	145	130	135
New Departure Mfg. Co., com.	..	..	165	173
New Departure Mfg. Co., pfd.	..	..	103	107
Packard Motor Company, pfd.	105½	107	..	95
Palmer & Singer, pfd.	..	..	..	65
Peerless Motor Company, com.	..	..	25	35
Peerless Motor Company, pfd.	..	..	85	90
Pope Manufacturing Company, com.	28	30	1	3
Pope Manufacturing Company, pfd.	69	71	14	20
Portage Rubber Co., com.	..	..	..	35
Portage Rubber Co., pfd.	..	..	..	92
Reo Motor Truck Company	8	10	6½	7½
Reo Motor Car Company	19	22	16	17
Rubber Goods Mfg. Co., pfd.	..	..	100	106
Russell Motor Car Co., com.	..	..	..	40
Russell Motor Car Co., pfd.	..	..	..	70
Splitdorf Electric Co., pfd.	..	..	41	48
Stewart-Warner Speedometer Co., com.	..	..	62	64
Stewart-Warner Speedometer Co., pfd.	..	..	96	98
Studebaker Company, com.	42	42½	17	18
Studebaker Company, pfd.	94½	95½	70	71
Swinehart Tire Company	98	100	80	85
U. S. Rubber Co., com.	⅜	⅝	58	60
U. S. Rubber Co., 1st pfd.	1½	2	104	105
Vacuum Oil Co.	..	..	172	175
White Company, preferred	105	108	105	110
Willys-Overland Co., com.	..	..	64½	67
Willys-Overland Co., pfd.	..	..	85	92

New L. P. C. Motor Co. Starts To Manufacture—200 Men at Work

RACINE, WIS., Nov. 4—With Capt. Wm. Mitchell Lewis at the head of the executive and administrative departments and Rene W. Petard, well known French engineer, in charge of the operating and production departments, the newly organized L. P. C. Motor Co. of Racine, capital $250,000, on Monday began the production of its initial issue of cars, 500 in number, to be placed on the market in America and Europe immediately after the beginning of the new year. More than 200 men went to work in the new plant Monday morning.

As announced in last week's issue, the L. P. C. Motor Co. was organized October 29 by Capt. W. M. Lewis, Rene W. Petard and E. B. Hand, all of Racine, to manufacture and market motor vehicles. Capt. Lewis is president and general manager of the new company. E. B. Hand, for many years associated with Capt. Lewis, is vice-president, and Rene W. Petard, late of Paris, is secretary-treasurer and factory manager. Mr. Petard joined the Mitchell-Lewis company 2 years ago as chief engineer and designed the present Mitchell car. For eight months Messrs. Lewis and Petard have been developing a new car and have had three models on the road since May 1.

The Lewis, is a six-cylinder car with a block motor with 3 1-2-inch bore and 6-inch stroke. It will be featured in a six-passenger body type. Details concerning the price have not been made public. However, it is stated that the car will weigh but 3,100 pounds ready for the road, which includes complete equipment and 36 by 4-inch wheels and tires.

Ewing a Voluntary Bankrupt

CLEVELAND, O., Oct. 30—I. E. Ewing, automobile manufacturer, filed a voluntary petition in bankruptcy in the Federal Court today, giving liabilities of $590,540 and assets of $400. The liabilities include $190,000 due the creditors of the Findlay Motor Co.

Market Changes of the Week

A few changes of small importance occurred in this week's market reports. Both electrolytic and Lake coppers dropped in prices, the former $0.00 2-5 and the latter $0.00 3-8 per pound. Cottonseed oil showed considerable steadiness on Monday, largely as a result of the higher provision markets. Closing at $6.99 a barrel, it showed a gain of $0.18. There was no life or snap to the crude rubber trading during the latter part of the week. Quiet conditions ruling both here and abroad. Up-river Para was calling at $0.75, and the plantation grades were on an easier basis. The situation in the local market for automobile scrap rubber underwent no material change for the week, though the quotations were lower on an average than last week. Lead was steady at the end of the week, though a decided drop occurred on Tuesday, the closing price being $4.20 per 100 pounds. Antimony was dull, remaining constant at $0.06 1-4 per pound. Tin experienced a small drop of $0.07 per 100 pounds.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, lb.....	.06¼	.06¼	.06¼	.06¼	.06¼	.06¼	.....
Beams & Channels, 100 lbs....	1.56	1.56	1.56	1.56	1.56	1.56	.....
Bessemer Steel, ton	22.00	22.00	22.00	22.00	22.00	22.00	.....
Copper, Elec., lb..	.16⅜	.16½	.16½	.16⅜	.16⅜	.16½	— .00⅜
Copper, Lake, lb..	.16⅞	.16⅞	.16⅞	.16⅝	.16⅝	.16½	— .00⅜
Cottonseed Oil, lb.	6.81	6.87	6.97	6.90	6.99	6.99	+ .18
Cyanide Potash, lb.	.19	.19	.19	.19	.19	.19	.....
Fish Oil, Menhaden, Brown..	.38	.38	.38	.38	.38	.38	.....
Gasoline, Auto, 200 gals.....	.22¼	.22¼	.22¼	.22¼	.22¼	.22¼	.....
Lard Oil, prime...	.95	.95	.95	.95	.95	95	.....
Lead, 100 lbs.....	4.35	4.35	4.35	4.35	4.35	4.20	— .15
Linseed Oil.....	.50	.50	.50	.50	.50	.50	.....
Open-Hearth Steel, ton.....	22.00	22.00	22.00	22.00	22.00	22.00	.....
Petroleum, bbl., Kansas, Crude..	1.03	1.03	1.03	1.03	1.03	1.03	.....
Petroleum, bbl., Pa., crude.....	2.50	2.50	2.50	2.50	2.50	2.50	.....
Rapeseed Oil, refined	.64	.64	.64	.64	.64	.64	.....
Rubber, Up-River Para	.74	.74	.75	.75	.75	.75	+ .01
Silk, raw Italy...	....	....	5.20	....	5.20	5.10	.....
Silk, raw Japan...	....	....	4.00	....	4.20	3.98	.....
Sulphuric Acid, 60 Baume.....	.90	.90	.90	.90	.90	.90	.....
Tin, 100 lb.....	39.95	39.95	40.05	40.05	39.88	39.88	— .07
Tire, Scrap.....	.07½	.07½	.07½	.07½	.07½	.07½	.....

Court Allows Buffalo Club To Sell Ford Parts at Reduced Price

BUFFALO, N. Y., Nov. 3—An opinion which permits the International Automobile League, of Buffalo, to advertise to sell the the automobiles and patented parts of the Ford Motor Co. at any price desired was handed down Saturday here by Judge John R. Hazel, in United States district court. This may be done during the pendency of the suit brought against the league by the Ford concern. The opinion is on a motion to vacate an injunction preventing the league from selling at low prices and to dismiss the bill of complaint brought by the plaintiff.

"In March, 1913," says the opinion, "the court made an order enjoining the defendant from representing or advertising that it could or would sell to members or customers the Ford automobiles or patented parts at less than the regular price of the Ford company and from infringing on the company's patents. Subsequent to that time," continues the opinion in effect, "the supreme court of the United States in the causes of Bauer & Cie. et al against O'Donnell (the Sanatogen case) held: That the patentee may not by notice limit the price at which future retail sales of the patented article may be made, such article being in the hands of the retailer by purchase from the jobber who has paid to the agent of the patentee the full price asked for the article sold."

If fraud had been charged in the action, Judge Hazel holds, it might be all right to maintain the injunction; but this was granted on the theory that the patentee had the right to restrict the price at which his article should be sold on the open market. "The preliminary injunction should be vacated," Judge Hazel concludes, "but as the complainant may be entitled at the final hearing to injunctive relief, the motion to dismiss the bill is denied."

The league advertised widely that it was in a position to sell the Ford cars at a considerably smaller figure than that named by the company. Suit was brought in consequence.

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NEW YORK CITY, Oct. 31—Leonard Dyer will make a short trip to Indianapolis, this week, where he will visit some of the factories. From there he will go to Detroit.

Paige Increase $1,200,000

Net Gain for Past Quarter to That Amount—Production Nearly Doubled

DETROIT, MICH., Nov. 3—September 28, marked the fourth birthday of the Paige-Detroit Motor Car Co., and it was shown at a meeting held on this anniversary that the concern has enjoyed a net cash increase of $1,200,000 for the past quarter. The Paige company has enjoyed a steady growth, and its output for 1914 is set at 13,500 cars as against 800 for the first year it was in business. This enormous production for the coming year will be made possible by the occupancy of the concern's new factory on Fort and McKinistry streets on about December 1.

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Receiver Appointed for Marion

INDIANAPOLIS, IND., Nov. 4—*Special Telegram*—On application of the Kinsey Mfg. Co., Dayton, O., James Kepperley has been appointed receiver for the Marion Motor Car Co., with instructions to continue operating the plant under order for court. The receiver was appointed by Judge C. E. Weir of the County Superior Court. Mr. Kepperley is one of the attorneys for the company.

The plaintiff alleges that the Marion company owes it $19,202.65 and has a total indebtedness of about $500,000. The company did not oppose the appointment of a receiver and Mr. Kepperley was satisfactory to both parties.

The Marion company has been embarrassed by the limitation of credit by bankers hampering it in the matter of working capital. Its assets are said largely to exceed its liabilities.

Inter-State Wants New Receiver

MUNCIE, IND., Nov. 3—The stockholders and directors of the Inter-State Automobile Co., Muncie, Ind., are attempting to agree on a trustee in bankruptcy to take charge of the company's affairs. It is hoped to have a trustee succeed Rollin Warner, the receiver appointed recently by the United States Court. The company has considerable business on hand and if this can be turned out, it is said the company will be able to settle its financial difficulties and get on its feet again.

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I. M. C. Minority Extension Granted

NEW YORK CITY, Nov. 3—An extension has been granted to the minority stockholders of the International Motor Co., until Friday in which to submit further affidavits and memoranda and also the missing documents. Judge Garretson has ordered the company lawyers to give all information to the court, including these documents, the absence of which have hampered both the Judge and the complainants in the argument of the case.

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Willys-Overland Elects Officers

TOLEDO, O., Oct. 28—The regular annual meeting of the stockholders of the Willys-Overland Co., held here today, was unusually well attended. Of the 200,000 shares of common stock, 183,812 were present, 9,000 of which was represented by proxies, the balance in person.

The following officers were elected: President, John N. Willys; first vice-president, Isaac Kinsey; second vice-president, Charles Janeson; secretary, Royal R. Scott; treasurer, Walter Stewart; comptroller, A. H. Smith. These, with Rathbun Fuller, constitute the board of directors.

The annual reports of the president and treasurer were read and placed on file. These reports show an unusually prosperous condition, there being a net profit during the past year exceeding $5,600,000. Prospects are for even better business for the future.

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Big Lozier Convention Nov. 17-18

DETROIT, MICH., Nov. 3—A sales conference of the Lozier dealers has been called for November 17 and 18 at the company's offices in this city by sales manager Paul Smith. Present indications lead to the belief that this will be the largest attended meeting of the kind yet held by the Lozier company. The new four-cylinder model will be shown at this time and the dealers given demonstrations of it on the roads around Detroit. A large production of this new four is contemplated.

Bosch Co. Sues Splitdorf and Hendee

Defendant Concerns Are Asked To Desist from Infringements and To Render an Accounting

NEW YORK CITY, Nov. 5—Following directly its announcement to take action against infringers of the Honold patent No. 974,967, which covers the basis of magneto ignition for gas engines of the two-cylinder, V type construction, the Bosch Magneto Co., through its attorneys, Messrs. Pennie, Davis & Goldsborough, has notified the Hendee Mfg. Co., Springfield, Mass., and the Splitdorf Electrical Co., Newark, N. J., to discontinue at once, alleged infringments of Bosch patents.

The Hendee Co. is asked to desist at once from such infringement and to account to the Bosch Magneto Co. for such infringing sales as have been made. The Hendee Mfg. Co., is a very large manufacturer of motorcycles and while it has sold a considerable quantity of Bosch-equipped motorcycles during the past seasons, several hundred or more of its machines equipped with Splitdorf magnetos recently have been sold. Those magnetos are claimed to be infringements of the Bosch patent.

The Splitdorf Co. is asked to desist at once from such manufacture and sale of magnetos as infringe upon the claims of the Bosch patents and to account to the Bosch Magneto Co. for all past infringements.

Stromberg-Zenith Litigation

DETROIT, MICH., Nov. 1—In THE AUTOMOBILE October 9, statement was made in connection with the patent litigation between the Stromberg and Zenith carbureter concerns that a suit was still pending in which the Stromberg company had sued the Zenith company in November, 1912. This suit was dismissed on June 30, 1913. The present pending litigation is confined to a suit brought by the Stromberg company against the John A. Bender Co., Chicago, dealer for the Keeton car. There is no suit at present between the two carbureter concerns.

J-M. Co. to Market Jones Speedometer

NEW YORK CITY, Nov. 5—The Jones speedometer has placed the control of its distribution in the hands of the H. W. Johns-Manville Co. Within the next few months completely equipped service stations will be established in all localities essential to giving owners of Jones instruments speedy service or adjustments close at home.

The speedometer will continue to be manufactured under the personal supervision of Joseph W. Jones, the inventor. The affiliation with the Johns-Manville company adds the J-M service and manufacturing facilities to those of the Jones. The speedometer will now be marketed through the forty-nine branches of the Johns-Manville company, and will have the personal attention of the 589 managers and traveling representatives connected with the organization. All of these forty-nine branches will be equipped as service stations.

In each service station there will be an expert mechanic, familiar with every detail of speedometer construction, for the convenience of dealers and customers. Each station will have on hand repair parts ready for instant use. Any instrument found to be defective in material or workmanship will be replaced. Service stations will be established and ready for business early in January.

Invents Tri-Cycle Car

PEORIA, ILL., Oct. 31—Linton Tischer, of this city, has invented and manufactured a tri-cycle car, or a three-wheeled automobile, which is now running over the streets of this city. The young man has devised a patent steering apparatus which allows the machine to go around the corner at high speed and makes it practically impossible to tip over. It will be put on the market with a cycle car and friction transmission, with belt drive on both wheels. The machine weighs but 350 pounds and will sell for $350.

Columbus Buggy Doing Well

COLUMBUS, O., Oct. 31—Under the management of the creditors' committee, the Columbus Buggy Co. is turning out a number of both gasoline and electric cars. Total sales for the month of September exceeded those of September of 1912 by a large margin.

According to the committee, when the stock of materials on hand is used up the production of the six-cylinder car and the runabout will be discontinued. In the gasoline line the company will make only the five and seven-passenger cars and the limousine, on the same chassis.

DETROIT, MICH., Nov. 3—As the result of a general reorganization scheme of the field men of the Hudson Motor Car Co., Detroit, Percy D. Stubbs, assistant sales manager, leaves for the coast this week to take complete charge of the Hudson sales west of Salt Lake City.

Carbureter with Injector for All Fuels

(*Continued from page 877.*)

pressure upon the fuel and thereby assists the air jet *k* in drawing fuel from *f*. The latter is of considerably larger dimensions than ordinary gasoline jets, this and the mode of action making the velocity of the flow from it much smaller, and this has the effect that the jet cannot easily be clogged and also that a very slight admission of air can bring about all the difference in the fuel feed which may be required for different fuels, altitudes or climates without interfering with the siphon effect of air jet *k*. This effect is therefore practically a constant factor and so powerful that fuels like benzol, kerosene and even tar oil can be atomized; and in fact they require a larger diameter of the jet than is needed for gasoline, owing to their greater viscosity.

The throttling of the motor is effected by a piston *e* which is formed with a conical end capable of acting as a valve seat shutting the explosive mixture entirely off from the induction pipe. Cold additional air flows from the conduit *a* through slits *z* and z^1, according to the position given the piston *e*, and screens *s* are interposed to prevent damage from possible carbureter explosions, this with especial reference to the use of the carbureter for aviation or in places where inflammable materials are handled close to the motor.

For kerosene motors the carbureter is made with two float chambers in order to be able to warm the motor first with gasoline. For benzol no special arrangements are said to be required, but if it is intended to operate with either benzol or gasoline, and the latter of any convenient grade, the jet is chosen so small that the full feed of gasoline will not be supplied unless the air valve *l* is opened slightly, and, when a heavier fuel is subsequently to be used, this valve is then closed and the fuel feed is reduced, giving the larger air percentage now called for, without it being necessary to change the jet and without getting a less energetic atomizing action from the air jet *k*.

The Bucherer construction is claimed to serve economy not only by admitting the use of the less expensive fuels but also by reducing the amount consumed for any of them.—From *Der Motorwagen*, October 10.

Goodrich and Motz Get U. S. Tire Contract

Supplies Will Be Furnished by W. G. Stevenson, W. C. Robinson and Baltimore Oil Companies

WASHINGTON, D. C., Nov. 4—*Special Telegram*—Under bids opened recently for furnishing supplies for twenty White trucks and twenty-one Wagenhals trucks recently purchased by the postoffice department, the department today awarded contracts to B. F. Goodrich Co., Motz Tire Co., United States Tire Co. William G. Stevenson, Philadelphia, William C. Robinson & Co., Baltimore, and the Baltimore Oil Co. These firms will furnish the necessary supplies during fiscal year ending June 30 next for the forty-one cars purchased by department as an experiment for delivery parcel post packages in various cities through the medium of its own employees and cars instead of by contract as is now largely done.

R. C. H. Plant to Be Sold Nov. 11

DETROIT, MICH., Nov. 4—The R. C. H. Corp., which has been given until November 5 to file its answer to the petition made by three merchandise creditors that the concern be placed in involuntary bankruptcy will in all probability be adjudicated a bankrupt on that date by Judge Tuttle. The entire plant will be offered at public auction on Nov. 11 by the receiver, the Security Trust Co., Detroit, and in thus declaring the corporation bankrupt prior to the sale, any claims which contending parties might make as to the validity of same on the date set will be eliminated. After the sale, the court will confirm it so that it will hold so far as the courts are concerned.

There are 810 creditors concerned in the equity proceedings. When offered on the 11th, the property will be sold either in parcels or in bulk. The property is valued at $807,197.61, made up of real estate to the value of $201,000; plant equipment and machinery at $213,889.75; materials, supplies and branch stocks at $313.968.28; cars at $14,530; accounts receivable $60,634.58 and notes receivable $3,175.

Canadian Ford Passes Dividend

WINDSOR, ONT., Oct. 30—At the annual meeting of the Ford Motor Co., of Canada, held at the company's offices in Walkerville yesterday afternoon, no action was taken on the dividends. G. A. McGregor, general manager of the company, stated that the failure of the directors to act on the dividend was on account of the present extremely unfavorable financial situation. The company is in a splendid financial condition, he said, but it was deemed wise under the present circumstances to defer any dividend payments until the Western banking situation becomes more satisfactory. Stockholders readily understood the situation and there was no unrest.

Lincoln Highway Has Big Opening

DETROIT, MICH., Nov. 3—Reports received at the National Headquarters of the Lincoln Highway Association Saturday indicate that the dedication celebrations of the route of the highway across the country on Hallowe'en night were the biggest things of the kind that have ever taken place in this country. In some of the states the governors proclaimed the day a legal holiday; in hundreds of cities, villages, hamlets and at thousands of cross roads there were bonfires. It is said that in Indiana from the Ohio state line on the east to the Illinois line on the west the farmers hauled corn cobs and old fence rails and literally blazed the route across the state. In South Bend over 500 cars took place in a parade. United States Senator Shively, Lieutenant Governor O'Neal, Judge Farburgh and others delivered addresses, and with the store decorated and huge bonfires, it was the largest tournament in the history of South Bend.

New Hudson Small Six for 1914

(*Continued from page 879.*)

gradually toward the front so as to give a good motor support. At the rear its width is 39 inches, whereas at the front end it measures 30 inches across. This design makes a cheaper and quicker manufacturing proposition and is equally as good as any other shape. There is a 3-inch kick-up at the rear to clear the axle.

The brake equalizers and cross-shafts are concealed under the cross-member forward of the rear axle. Besides simplifying the chassis appearance this location for them has the advantage that should any weaving action take place in the frame, a cramping action does not result in the brake cross-shafts. The shafts pass through the frame and the rods pass back to the drums outside of the frame, those of the larger six being within the frame.

No new features appear in the pressed-steel, floating rear axle. The driving gears and differential may be taken out as a unit; the nickel-steel driving shafts may be removed without disturbing any other parts of the axle; a large plate is provided at the back for inspection and adjustment. A large nozzle has been provided on the rear to admit of easy lubricant insertion. The pinion shaft is mounted on New Departure bearings, and Timken roller bearings carry wheels and axle shafts.

Inverted Lemoine Axle Type

The light six also appears with a front axle which is entirely new to Hudson construction. It is a design which is known as the Inverted Lemoine type. The principal difference is in the steering knuckle, the spindle being suspended from the top of the knuckle instead of in the center as in the usual type. Thus the entire vertical spindle portion is below the horizontal wheel spindle. This construction simplifies the forging and makes a nearly straight axle, there being very little downward dip to the I-beam.

The speedometer drive is effected by means of a shaft through the center of the wheel spindle, terminating at the inner end in a pair of spiral gears, at which point connection is provided for the attachment of the speedometer shaft. The outer end is driven by a steel stamping, located in the hub cap.

Left Drive on All Models

Left drive and center control are used, the steering column passing through the cowl board. Tires are 34 by 4 inches, provision being made for carrying the extras on the front end of the left running board. A trunk rack takes the place of tire carriers at the rear.

Entrance to the phaeton is from either side, while doors are exceedingly wide, 20 inches in front and 21 inches in rear. Hinged auxiliary seats fit into slots in the floor of the tonneau. Crowned fenders are also used as on the larger six. The equipment is most complete in every respect and includes a one-man top, which may be raised by one person. There are no side supports at the front end, all being at the rear, giving an exceedingly neat appearance.

Besides the phaeton and open roadster body types, this new Six-40 is to be fitted with a cabriolet body, and when so dressed lists at $1,950.

First incline of the Devil's Canyon, Imperial county, Cal., on the Los Angeles-Phoenic race route

Locomobile Six Wins Desert Race

Orin Davis Covers 564-Mile Run in 18 Hours and 50 Minutes—Faster Than 1912

PHŒNIX, ARIZ., Nov. 4—*Special telegram*—Orin Davis, at the wheel of a Locomobile six cylinder, today won the sixth annual Los Angeles-Phœnix road race after 18 hours 50 minutes of spectacular driving over 564 miles of mountain and desert roads. Davis crossed the finishing line here at 1.48 o'clock this afternoon, 2 hours 15 minutes ahead of Guy Ball, pilot of No. 11 Marmon, who finished second in 21 hours 4.5 minutes. Davis, who is a novice, averaged 29.94 miles per hour and shattered the 28.2 miles per hour record of Ralph Hamlin, who, in a Franklin, won the 511-mile race of last year.

Trailing 1 hour 6 minutes behind Ball's Marmon came Louis Nikrent in a Buick. J. C. Rice, driver of the No. 23 Simplex, finished fourth after turning over once.

Hardest Race Ever Held in West

Of the twenty-five cars that started from Los Angeles at daybreak yesterday morning eleven were eliminated between the Coast city and Phœnix. It was the hardest race ever held in the West. Barney Oldfield was a serious contender until the flywheel of his Simplex hit a high center this morning and put him out of the race. The veteran drove like a madman yesterday. He covered the 140 miles between Los Angeles and San Diego in 2 hours 42 minutes, and was the third man to check in at Yuma, the first control.

During the day it was reported that Oldfield, after leaving Yuma, had been killed in collision with a rancher's buggy, but this proved false, when Barney made his appearance here late this afternoon, smiling and smoking his cigar.

Carlson, in a No. 2 Simplex, burned out a bearing 200 miles out from Los Angeles. Toft, in another Simplex, broke a wheel when only 60 miles from the starting point. The two Fiats, driven by Verbeck and Waters, were eliminated by engine trouble, and the Appersons tooled by Tobin and Wallace quit for the same reason.

Soules Passed Davis

Charles Soules, driving a No. 1 Cadillac, passed Davis this morning when 15 miles out of Yuma, then his car leaped a 4-foot gulley and broke its frame. From there on, the Locomobile did not have a contender. Davis covered the first 100 miles in 2 hours 30 minutes and went into Yuma first yesterday after being on the road 10 hours 32 minutes. Rice was second, 12 minutes behind and Oldfield third. The others checked in at intervals during the next 3 hours.

Davis was the first to make his getaway this morning on the last lap, which is 206 miles. He left Yuma at 5.35 a. m. Soules was second to leave, Oldfield third and Rice fourth. Davis is a chauffeur for A. B. Daniels of Los Angeles.

He drove a 1913 Locomobile six equipped with a Rayfield carbureter.

Summary:

Finish	Car and Driver	Time	MPH
1	Locomobile, Davis	18.50.00	29.94
2	Marmon, Guy Ball	21.05.00	25.43
3	Buick, Nikrent	22.11.00	25.42
4	Simplex, Rice	22.58.00	24.55
5	Mercer, Buxton	23.33.00	23.83

Denver City Car Cup Goes to Franklin

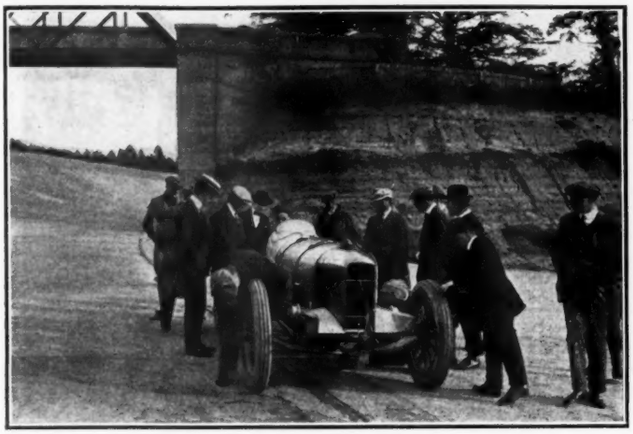
DENVER, COL., Oct. 29—The cup for the large-car class in the Denver Motor Club's recent hill-climbing contest at Mt. Falcoln has just been awarded the Franklin car, which covered the 3½-mile course in 17 minutes 31 1/5 seconds. The car was driven by E. H. Bull.

The delay in definitely deciding the winner of the large-car event was due to a protest entered by J. A. Landing, Case driver, who claimed that he suffered a loss of time because someone inadvertently started down from the summit before he had finished the climb. It was finally decided, however, that whatever interference took place was not sufficient to justify repeating the contest for the big cars, or withholding the prize for a special climb by the Case. Landing's original time was 17 minutes 45 2/5 seconds. The Franklin and the Case were the only large cars finishing the climb, and both were well within the former record of 22 minutes for any class of car.

Owing to some confusion in announcing the results of the contest, the account in THE AUTOMOBILE for October 16 failed to separate the big cars from the small-car class. This error did the Franklin and Case cars the injustice of making it appear that they got fifth and seventh places, respectively, in a free-for-all contest, instead of first and second in their separate class. The corrected summary shows the Maxwell, Chevrolet, Ford, Metz and Hupmobile finishing in the order named, in the small-car class. The Chevrolet has also been awarded the efficiency prize, which was open to all contestants.

The distinction between the two classes of cars, for the purpose of fairness in judging upon the basis of the time made, is rendered especially important by the nature of the course, which has several turns so sharp that any car having a wheelbase greater than 100 inches is seriously handicapped. Half a dozen of the turns, for example, compelled the two big cars named to come to a full stop and then back a few feet in order to make them.

Just west of Campo, Cal., on the Los Angeles-Phoenix route, a somewhat rocky region



The twelve-cylinder Sunbeam starting on a preliminary lap before attempting records. Chassagne is at the wheel with M. Coatalen at his right, and M. Resta at his left

Lambert Killed at 114 M. per Hour

World's Record Breaker Meets Death at Brooklands When Tire Bursts at Top of Embankment

LONDON, ENG., Oct. 31—Percy Lambert, the holder of many world's automobile speed records, and the first man to drive an automobile 100 miles in 1 hour, was killed on the Brooklands track, while he was going at the rate of 114 miles an hour. The accident was due to the bursting of a tire, causing the machine to turn turtle at the top of the embankment and then fall to the bottom. Only on Monday of that week Lambert had captured the 50 miles world's record, covering the distance in 27 minutes 2.4 seconds. On February 15, this year, on the same track, he had established a record for the hour of 103¾ miles and at the same time 100 miles record of 57 minutes 49 3/5 seconds.

Twelve-Cylinder Sunbeam Latest Record Breaker

LONDON, Oct. 15—Some great things have been accomplished and still greater are expected by the big twelve-cylinder Sunbeam that has been providing sensations at the Brooklands track during the last few weeks. In a recent event in which this car with Chassagne at the wheel, engaged in a spectacular tussle with a Talbot the speed of 110.75 miles per hour was registered. This is the highest figure ever recorded at Brooklands for a standing start race.

The race in question was an 8.5-mile handicap. In the second lap in which the Talbot was overtaken by a daring dash at one of the bends the speed climbed up to almost 120 miles per hour. The actual average speed for the lap was 118.9.

The figures now standing to the credit of the twelve-cylinder Sunbeam are: 50 miles at a speed of 108.38 miles per hour; 100 miles at a speed of 107.93 and 150 miles at 105.57 miles per hour. Its victories also include the 1-hour record, in which a distance of 107.95 miles was covered defeating the previous figure of 106.22 put up by the Peugeot. The distance records mentioned above were also, previous to the Sunbeam's attacks, held by the Peugeot.

The cylinder dimensions of this latest speed wagon are 3.15 inches by 6.1 inches. It is a one-seater of streamline form carrying the fuel and lubricating oil in a divided tank constituting the tail.

France To Have 9-Day Tour

PARIS, FRANCE, Oct. 25—Next year's French competitive season will open with a 9-day tour from February 15 to 25 for three classes of cars having maximum cylinder areas of respectively 67, 91, and 122 cubic inches. The trials will take the form of a reliability and endurance test, all competitors having to cover about 180 miles per day for 9 successive days at an average speed of not less than 19 miles an hour. It is stipulated that stock cars shall be entered and that they shall run with full touring equipment. Practically every part of the mechanism will be sealed, the loss of a seal entailing penalization points according to the importance of the parts. Gasoline and lubricating oil will be measured out to the competitors every day, the tanks being sealed after this operation, and all tires will be stamped. Throughout the tour a close account will be kept of all fuel consumed and tires changed, awards being made on an economy basis among the cars having passed the preliminary requirements of covering the distance without the changing of any part or late arrival at any control. Starting from Paris, the daily stopping stages will be Orleans, Limoges, Toulouse, Avignon, Nice, Grenoble, Dijon, Nancy, and Paris. During the month of March a somewhat similar tour will be held for cars of greater power. The exact date of this event has not yet been fixed.

Goux Breaks More Records

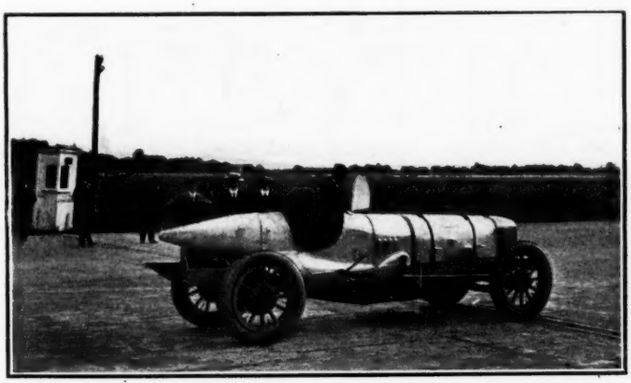
LONDON, ENGLAND, Oct. 24—Jules Goux, driving Mr. H. Boissy's 15.1 Peugeot, beat records in class E and the 16 rating class at Brooklands recently. For the flying half-mile he made 16.95 seconds, a speed of 106.19 miles per hour; for the flying kilometer his time was 31.14 seconds, equal to 105.81 miles per hour; and for the flying mile he took 34.17 seconds, representing 105.36 miles per hour. Goux also captured the ten laps record, which is made from a standing start, covering the distance of approximately 27.5 miles in 16 minutes, 29.35 seconds, equal to 100.68 miles per hour. The average speed improvement over old records is about 5 miles per hour.—*The Westminster Gazette.*

American Motor Wheel Elects Directors

INDIANAPOLIS, IND., Nov. 3—At a meeting of the stockholders last Wednesday afternoon, directors were elected for the American Motor Wheel Co. of Crawfordsville. The directors then met and organized as follows: President, William M. White, a member of the state senate; first vice-president, C. W. Martin, Jr.; second vice-president, William M. Harty, Jr.; secretary, Robert A. Stubbins; treasurer, Frank W. Hurley; auditor, Irwin L. Garver; consulting engineer, Henry B. Coats; general counsel, Charles M. McCabe. All of the above, except Mr. Garver with the addition of Gilbert Howell, form the board of directors. The company, which will manufacture the Coats resilient motor car wheel, was incorporated some time ago with an authorized capitalization of $600,000.

Gerber Offers $237,000 for Abbott Plant

PITTSBURGH, PA., Nov. 5—*Special Telegram*—It looks as though the Edward F. Gerber Co. automobile dealers of Pittsburgh are determined to secure an automobile manufacturing business, for, after failing to secure the Michigan Buggy Co. at the recent hearing at Grand Rapids, the Gerber concern has offered $237,000 for the entire assets of the Abbott Motor Co. of Detroit. The offer was made to a committee of the creditors of the Abbott company, who are now considering the disposition of the plant as best they can. A meeting of those interested was held for this purpose yesterday, at which it was shown that if this amount were accepted, the creditors would receive about 68 cents on the dollar which includes secured paper.



Waiting the signal to start the twelve-cylinder Sunbeam on its record-breaking speed trials

Canada's Registration Increases 30 Per Cent.

Total Number of Automobiles Now in Use Close to 45,000—Nearly 50 Per Cent. of These in Ontario and Quebec—Largest Gains Shown in New Brunswick and Yukon

MONTREAL, QUEBEC, Nov. 1—Over 12,400 more cars were in use in the Dominion of Canada on November 1, than at the end of last year, according to figures compiled by the Automobile Club of Canada. The following are the totals for each of the provinces, including private and commercial vehicles and motorcycles:

	1912	1913
Quebec	3,597	4,706
Ontario	11,939	15,255
New Brunswick	289	789
Manitoba	3,943	5,016
British Columbia	4,666	7,044
Nova Scotia	867	1,300
Prince Edward Island	nil	.....
Saskatchewan	3,742	6,513
Alberta	2,835	3,640
Yukon	5	15
	31,865	44,278

It is rather remarkable that the largest gains among the motor vehicle using provinces were made at the two ends of the Continent—in New Brunswick and the Yukon, where the increases were over 300 per cent.

Kansas Has 33,318 Automobiles

TOPEKA, KAN., Nov. 1—A total of 33,403 motor owners paid the state registration tax in Kansas up to the last of October, according to the records in the office of Charles Sessions, secretary of state. Of this number there were 33,318 automobile owners and 6,085 motorcycle owners. The payment gives the various counties of the state over $150,000 for roads for the coming year. The automobile license and registration fee is $5 each of which $4.25 goes into the road funds of the various counties wherein it is paid. The motorcycle fee is $2.50 of which $2 is available for the roads.

Kansas City Claims Third Place

KANSAS CITY, Mo., Oct. 31—This city has risen to third place in this country as a distributing center for automobiles and accessories, according to figures recently made public by E. P. Moriarty, president of the local dealers' association. Only New York and Chicago surpass it, he says.

During the 12 months just ended the sale of pleasure cars here has amounted to $12,000,000 and of commercials about $1,150,000. Mr. Moriarty says. The figures for the tire and accessory business he placed at $3,000,000, although other members of the association declared that amount too small.

The local Ford agency reports having sold 5,000 cars from Kansas City during the year, the Overland 3,000, the Buick 1,500 and the Studebaker corporation cars valued at $1,150,000. The United States Tire Co. has done as large a business in tires as the Studebaker company.

Kansas City's trade territory includes the western half of Missouri, all of Kansas and Oklahoma, and parts of Nebraska and Texas. The number of concerns engaged in the automobile and accessory business here is given as 180.

To Motorize District of Columbia

WASHINGTON, D. C., Nov. 4—*Special Telegram*—Motor propelled fire apparatus will replace horsedrawn apparatus in the district as fast as practicable according to the annual report of Frank J. Wagner, chief engineer of the fire department, submitted to the commissioners today.

The department now has in service two motor pumping engines and one motor, propelled chemical and hose wagon. "The apparatus," says Chief Wagner, "has rendered such splendid service since its installation that the purchase of horse-drawn apparatus will be discontinued and motor apparatus recommended in the future. The day of horse-drawn apparatus is drawing to a close. Motor fire apparatus is so much more economical that all the large fire departments of the country are advocating the motorizing of the horse-drawn apparatus."

Goodyear Branch Burned

MILWAUKEE, WIS.—The Goodyear Rubber Co.'s Milwaukee branch, located at 384-388 East Water street, which was totally destroyed by fire and explosion on Sunday night, October 26, with a loss of eight lives of firemen, announces that it has established temporary quarters at 338-340 East Water street and is re-stocking with goods from the New York, St. Louis, Kansas City and St. Paul branches, while its factories have given Milwaukee the right of way on all goods. A complete stock has already been installed. On the site of the old Goodyear building, where the company was located for 38 years, will immediately be erected an eight-story steel and concrete building. This will be completed about June 1, 1914.

Special Roads for Automobiles

The increasing use of automobiles in Europe is leading to the construction of special routes reserved exclusively for this class of traffic. One of the first of these to be built in Germany is to run between Düsseldorf and Dortmund, and it will have about 80 feet width throughout the whole length, according to the present project. As to the part of the route which traverses Westphalia, the several municipalities are now discussing the plans.

Withdraw Oakland-Lincoln Poster

NEW YORK CITY, Nov. 3—An article was published in THE AUTOMOBILE, October 16, page 727, giving an illustration regarding an advertising marker or poster which the Sidney B. Bowman Co., designed and distributed for the purpose of advertising the Oakland car. It now appears that this marker has been abandoned, and those which have been distributed have been called in, due to the unintentional infringement upon the Lincoln Highway marker.

Kentucky Has 57,000 Miles of Road

LOUISVILLE, KY., Nov. 3—According to R. C. Terrell, Commissioner of Roads, the total number of miles of highways in the state is approximately 57,000, containing within the roads 220,000 acres, averaging a value of $50 an acre. Kentucky's roads, including the right of way, bridges and machinery, represent an investment of $50,000,000.

Factory Miscellany

BATAVIA Factory Doubled in Size—Directors of the Batavia Rubber Co. decided recently to build an addition to the plant, which, when the machinery equipment is installed, will double the present capacity of the factory, which is already crowded to accommodate the business. Work will be begun as soon as the contract can be let for the erection of the building, which must be ready for occupancy by February 1, 1914. Plans prepared call for a structure having a frontage of 101 feet on Robertson street and a depth of 85 feet, three stories in height, which will provide 25,000 square feet of additional floor space. Foundations, however, will be put in of sufficient strength to permit the building later of two additional stories. The addition will join the present factory on the north on land recently bought by the company. The building will be of steel and brick, 15 feet from floor to floor, and of the most advanced type of factory construction. Large windows, with steel sash will be put in to afford plenty of light.

Goodyear Plant Burned—Fire destroyed the Goodyear Rubber Co.'s building at Milwaukee, Wis., recently. The damage is estimated at $500,000.

To Build Plant—The cornerstone for the new $15,000 plant of the Van Blerck Motor Co., removed from Detroit, Mich., to Monroe, Mich., was laid recently.

New Detroit Plant—A new plant to cost $75,000 is contemplated by the Joseph Smith Mfg. Co., Detroit, Mich., manufacturer of automobile hardware.

Mill for McGraw Tire—The foundation blueprints from the Farrell Foundry & Machine Co. of Ansonia, Conn., have been received by the McGraw Tire Co. for the mill line in its factory, East Palestine, O.

Ford Using Royal Tourist Plant—The Ford Motor Co., Detroit, Mich., has announced a $500,000 plant to be built in Cleveland, O., and is now temporarily using the former factory of the Royal Tourist Motor Co.

Universal Truck Buys Land—From Highland, Ill., negotiations are being carried on by the stockholders of the Highland Water Co. with the Universal Motor Truck Co. for the sale of 10 acres of land on which this company plans to erect a plant.

Chester Plant Progressing—There is all sorts of activity at the buildings to be occupied by the Chester Rubber Tire & Tube Co., East Liverpool, O. Squads of men are at work making excavations for the concrete foundations upon which the machines will be set, boilers, engine and the like.

Martins Ferry Wants Plant—Citizens of Martins Ferry, O., are making an effort to secure the location of the L. & M. Rubber Co., organized at Carrollton, O., recently to make automobile tires among other things. A considerable amount of the stock of the company has been sold in Martins Ferry.

The Automobile Calendar

Shows, Conventions, Etc.

Nov. 8-15	Atlanta, Ga., Show, Atlanta Automobile & Accessory Assn.
Nov. 17	Los Angeles, Cal., Auto Show.
Dec. 6-13	Toledo, O., Annual Show, Factories Bldg., Toledo Auto Shows Co.
Dec. 9-12	Philadelphia, Pa., Annual Convention of American Road Builders' Association.
Dec. 11-20	New York City, First International Exposition of Safety and Sanitation, under the auspices of the American Museum of Safety.
Jan. 2-10, 1914	New York City, Importers' Automobile Show, Hotel Astor.
Jan. 3-10, 1914	New York City, Automobile Show, Grand Central Palace.
Jan. 10	Cleveland, O., Show, Cleveland Auto Show Co.
Jan. 10-16	Milwaukee, Wis., Sixth Annual Show, Auditorium, Milwaukee Automobile Dealers' Assn.
Jan. 10-17	Cleveland, O., Automobile Show, Wigmore Coliseum, Cleveland Automobile Show Co.
Jan. 12-17	Bridgeport, Conn., Annual Automobile Show, State Armory, B. B. Steiber, manager.
Jan. 17-24	Pittsburgh, Pa., Annual Automobile Show, Automobile Dealers' Assn.
Jan. 24-31	Montreal, Que., Automobile Show, Passenger Cars, Montreal Automobile Trade Assn.
Jan. 24-31, 1914	Chicago, Ill., Automobile Show, Coliseum and First Regiment Armory.
Jan. 26-31, 1914	Scranton, Pa., Automobile Show, Automobile Assn. of Scranton.
Jan. 31-Feb. 7, 1914	Minneapolis, Minn., Automobile Show.
Feb. 2-7	Buffalo, N. Y., Automobile Show, Buffalo Automobile Dealers' Assn.
Feb. 3-7	Montreal, Que., Motor Truck Show, Montreal Automobile Trade Assn.
Feb. 7-12	Seattle, Wash., Annual Automobile Show, State Armory Bldg., W. I. Fitzgerald, Manager.
Feb. 9-14	Buffalo, N. Y., Truck Show, Buffalo Automobile Dealers' Assn.
Feb. 16-21	Kansas City, Mo., Auto Show.
Feb. 21-28	Newark, N. J., Automobile Show, N. J., Auto Trade Assn.
Feb. 22-March 5	Cincinnati, O., Automobile Show, Cincinnati Automobile Dealers' Assn.
Feb. 23-28	Omaha, Neb., Automobile Show, Omaha Automobile Assn.
Mar. 2-6	Fort Dodge, Ia., Show, Fort Dodge Auto Dealers' Assn.
Mar. 7-14	Boston, Mass., Automobile Show.
Mar. 9-14	Des Moines, Ia., Show, Des Moines Automobile Dealers' Assn.
March 17-21	Boston, Mass., Truck Show.

Race Meets, Runs, Hill Climbs, Etc.

Nov. 6	Phoenix, Ariz., Track Meeting, State Fair.
Nov. 7-8	Philadelphia, Pa., Economy Run, Quaker City Motor Club.
Nov. 9-12	Shreveport, La., Track Race, J. A. Sloan.

Foreign

Nov. 7-15	London, Eng., Annual Automobile Exhibition, Olympia.

Tire Plant in Xenia—A movement is on foot for the organization of a corporation for the manufacture of tires and all rubber automobile accessories. It is planned to have a preliminary capital of $60,000 and to erect a large plant. Roy Bickett, head of the Xenia Rubber Co., is the moving spirit in the enterprise.

Spring Wheel Factory Promised—Montgomery, Ala., has been selected as the site for a factory for the manufacture of an adjustable spring wheel for automobiles, a new invention, and T. N. Jordan, of Long Beach, Miss., the inventor, says Montgomery will get the factory if the proper inducements are offered. If the factory is built there over 300 workmen will be employed.

Case Co.'s Safety Club—The J. I. Case T. M. Co., Racine, Wis., employing 6,000 men in its various departments, including a large motor car works, has launched an elaborate safety campaign by organizing a safety club among officials and employees. A banquet was given to 250 department heads, foremen and officials, at which J. D. Beck, member of the Industrial Commission of Wisconsin, and C. W. Price, safety expert for the commission, were the guests of honor and principal speakers. It developed that 33 1-3 per cent. of accident prevention results from mechanical safeguards and 66 2-3 per cent. is left to the human equation. The Case plants are models from the standpoint of safety through mechanical safeguards, and the safety club will now pursue an educational campaign to take care of the 66 2-3 per cent. of accident prevention which is left by the use of mechanical safeguards.

Ford Advances Wages—A scientific grading of the operatives in the Ford plant at Detroit, Mich., has resulted in a general increase of wages through the plan estimated at not far from 13 per cent. Three subdivisions have been outlined in each general grade. As an illustration, in the so-called "C" grade, all machine operators and car assemblers are classified, and as a subdivision in "C" the beginners, those just starting to work, are graded. Men entering in the employ of the company in this grade all receive the same wage. As soon as the man has demonstrated his ability and becomes an operator of average proficiency it is expected that his foreman will advance his wage by a certain fixed sum and his skill rating to "C_2," and again after the man has advanced from operator of average ability to a first-class workman another raise in pay is given him and his skill rating advanced to "C_1." There is a still further subdivision in the two grades, B and C, which include approximately 80 per cent. of the help, and this grade is a grade or rather a rate of wage paid on account of long service. An employee who has been with the company two years or more and is a first-class workman receives special consideration for his service over and above the wage paid for a first-class workman in his grade.

The Week in the Industry

Motor Men in New Roles

HOOKE Goes to Elyria—Harvey L. Hooke, assistant general manager of the Gramm Motor Truck Co., Lima, O., has been succeeded as head of the business by E. A. Williams, Jr., whose title will be assistant general manager. Hooke has been transferred by President John North Willys to Elyria, O., where he will have charge of the plant of the Garford Mfg. Co.

Knipper a Benedick—William Knipper will be married to Mae Christine Ottman in Rochester, N. Y., on November 6.

Stiger an M. A. M. Director—C. W. Stiger has been made a director of the Motor and Accessory Manufacturers, of New York City.

Severance Racine Sales Manager—Herbert L. Severance has been appointed sales manager of the Racine Rubber Co., Racine, Wis.

Woods Electric Loses Woodward—O. J. Woodward has resigned his position of sales manager for the Woods Motor Vehicle Co., Chicago, Ill.

Harris Succeeds Pennal—The Russell Motor Car Co., Ltd., Toronto, Ont., has appointed B. S. Harris to succeed F. G. Pennal, Montreal, Que., as manager.

Hill Becomes Salesman—George Hill, formerly racing partner to Teddy Tetzlaff, has joined the sales department of the English Motor Car Co., Los Angeles, Cal.

Beaver Imp Representative—A. M. Beaver, Portland, Ore., is now representing the Imp cyclecar throughout the Northwest. H. J. Berger is subagent at Eugene, Ore.

Leslie Smith with Locomobile—Leslie F. Smith is the latest addition to the Locomobile sales force in New York City. Mr. Smith was formerly with the Oakland company.

Thompson Motz Manager—E. F. Thompson was recently promoted from department manager of the Motz Tire & Rubber Co., Akron, O., to the position of sales manager.

Richard a Division Manager—Harry Richard, formerly with the John Millen & Sons, Ltd., has been appointed divisional manager of the Toronto territory for the Dunlop tire.

Biggam and Smith Join Locomobile—Henry C. Biggam and Leslie F. Smith have been secured as sales agents by the New York City branch of the Locomobile Co. of America.

Steele with Lyons—F. B. Steele, formerly with the Chalmers and Interstate companies, is establishing agencies for the Lyons Atlas Co., Indianapolis, Ind., throughout the central states.

Fremont with Chevrolet—Benton Fremont has resigned as manager of the Oakland in the vicinity of Paterson, N. J., to become manager of the Chevrolet Motor Co.'s New York branch.

Moreland Goes Anderson—B. E. Moreland, of the Carl M. Green Co., Detroit, Mich., has become special representative of the Anderson Electric Car Co., with headquarters at the Chicago branch.

Beer with Franklin.—C. M. Beer, for the past 12 years advertising manager for Drs. Hess and Clark of Ashland, O., is now connected with the publicity department of the Franklin Automobile Co., Syracuse, N. Y.

Franklin Founder Dies—James Pass, one of the most prominent business men of Syracuse, N. Y., and one of the original incorporators of the H. H. Franklin Mfg. Co., died Thursday, October 30, at his home in Syracuse.

Cox Resigns from Rambler.—C. H. Cox, for 8 years with the sales department of the Thomas B. Jeffery Co., Kenosha, Wis., latterly as assistant sales manager, has resigned his position to enter business on his own account.

Chandler Leaves Holt-Chandler—W. R. Chandler has retired from the Holt-Chandler Co., distributors of the Maxwell in and around New York City. He will be succeeded by S. W. Drecktrade as vice-president and general manager.

Joins Potomac Motor Co.—J. C. Henderson, for a number of years connected with the Woods Electric Vehicle Co. as Eastern sales manager for the Woods electric, has severed his connection with that company and has joined the sales staff of the Potomac Motor Car Co., of Washington, D. C.

Garage and Dealers' Field

Club Building in Los Angeles—The Automobile Club of Southern California is building a new home on Figueroa street, Los Angeles.

New Garage in Williston, N. D.—Fay N. Miller, as head of the Williston Motor Co., Williston, N. D., will distribute the Ford in this vicinity.

Columb Tire's N. Y. Agency—The Columb Tyres Import Co., Inc., of Riga, Russia, has opened an agency at 1891 Broadway, New York City.

Start Women's Classes—Special classes for women have been started by the West Side Young Men's Christian Association of New York City.

New Frisco Wescott Home—Another attractive building has been added to motor row by the Dillon-Goodwin Co., distributors of the Wescott.

Overland Takes New Quarters—New and larger quarters have been taken by the Overland agency in New Orleans, La., at 750 St. Charles street.

Buick in San Juan—S. A. Taylor of the General Motors Export Co. has gone to San Juan to look over the field and establish an agency for Buick automobiles.

Seattle's Carbon Remover Co.—H. L. Davis has opened a store at 303 East Pike street, Seattle, Wash., under the name of the Oxygen Carbon Remover Co.

New Supply Store in Seattle—The Ernst Hardware & Plumbing Co., Seattle, Wash., have recently added a motor accessory department to their regular line.

Wisconsin Doxameter Co. Organized—The Wisconsin Doxameter Co., Milwaukee, Wis., has been organized to distribute the Doxameter gas-saver in that state.

Ford Does Large Trade in Seattle—During the fiscal year just closed the Seattle branch of the Ford company distributed 4,047 machines in the Northwest territory.

Dealers' Convention in California—A convention of Southern California agents for Cadillac cars was held in Los Angeles during the past week. Newton Creaser presided.

Motor Trucks in Forest Fire—Motor trucks were of great assistance in carrying men, tools and supplies to fight the fire in the Sierra Madre Mountains in California recently.

New Savage Tire Deal—Baker & Hamilton, the pioneer hardware firm of San Francisco, Cal., have recently become distributors for the new Savage tires in northern California.

New Oil Stations in Wisconsin—The O'Niell Oil & Paint Co., 297 East Water street, Milwaukee, Wis., has established a storage tank station at Hartland, and is about to place others at Waukesha, Whitewater and West Bend.

Remodeling Is Finished—The remodeled salesroom and offices of the Buick Garage Co., Hartford, Conn., are now ready for occupancy. By alteration of the old quarters considerable space is gained. The offices are now at the rear of the building.

Opens Service Station—The Lakewood, O., Auto Sales & Garage Company has opened a new service station at Detroit and Riverside avenues, where they have one of the most complete plants in the city, combining service station, repairing plant and garage.

Novel Service System—Russell P. Taber, Hartford, Conn., Reo distributor, has put into operation a 50-hour free service system. The scheme holds good anywhere in the state of Connecticut where he has jurisdiction. On purchase of a car the buyer is presented with a blue card which bears his name. The card is good for 50 hours of free labor regardless of what sort of work may be necessary.

Thirty New Garages—One of the features of the year in the automobile industry in New Orleans is the number of specially built garages and salesrooms that have been constructed. No less than thirty such edifices have gone up since the first of the year. The buildings have been erected on very valuable tracts of land near the business center. Construction has been permanent. The maximum amount of plate glass has been used in fronts. Interior decorations are costly and in splendid taste.

Recent Incorporations in the Automobile Field

AUTOMOBILES AND PARTS

CHICAGO, ILL.—Ohio Motor Co.; capital, $5,000; to deal in motor vehicles, parts and accessories. Incorporators: Joseph Slottow, Samuel C. Wood, Fred C. Churchill.

CHICAGO, ILL.—Private Motor Service Co.; capital, $10,000; to deal in automobiles, parts and accessories. Incorporators: Chas. S. Bougher, Walter H. Eckert, Warren B. Buckley.

CLINTWOOD, VA.—Clintwood Motor Co.; capital, $10,000. Incorporators: J. F. Trivitt, B. D. French.

DALLAS, TEX.—Adolphus Auto Rent Co.; capital, $15,000; to operate a garage and deal in automobiles and accessories. Incorporators: T. B. Bower, C. L. Bower, T. A. Pitman.

DETROIT, MICH.—Sterling-Detroit Motor Co.; capital, $105,000; to engage in the manufacture of motor vehicles. Incorporators: H. Little, E. Finkerstead.

HOUSTON, TEX.—Spring-Roberts Auto Co.; capital, $15,000. Incorporators: W. H. Spring, F. S. Roberts, L. D. Thomas.

INDIANAPOLIS, IND.—Briskin-Wolsiefer Mfg. Co.; capital, $10,000; to manufacture and sell auto parts. Incorporators: J. H. Briskin, C. C. Wolsiefer, H. W. Bullock.

LOUISVILLE, KY.—Auto Tire Brokerage Co.; capital, $5,000; to buy and sell automobiles and tires. Incorporators: Allen L. McCormick, Charles L. Holden, S. Barry.

NEW YORK, N. Y.—Hirsch & Schwartz; capital, $10,000; to do a general automobile business. Incorporators: Jos. Schwartz, Louis Hirsch, Jacob Schwartz.

ROCKFORD, ILL.—Cotta Gear Co.; capital, $10,000; to manufacture and sell automobile accessories, motors and motor parts. Incorporators: Charles Cotta, L. P. Cotta, H. B. North.

ST. JOSEPH, MO.—Grand Central Motor Car Co.; capital, $5,000. Incorporators: W. J. Hendler, H. R. Lewis, Louis Segel.

ST. LOUIS, MO.—Bond Auto Co.; capital, $10,000. Incorporators: M. W. Bond, Charles Kist, Caroline Bond.

TOLEDO, O.—Carl Electric Vehicle Co.; capital, $300,000; to manufacture and deal in all kinds of electric vehicles. Incorporators: L. M. Hinders, W. G. McAleeman, R. E. Robertson, David L. Johnston, M. C. Myers.

WINDSOR, ONT., CAN.—Parsons Motor Car Co.; capital, $500,000; to manufacture and deal in autos and auto accessories.

GARAGES AND ACCESSORIES

BOSTON, MASS.—Parker Carbureter Co.; capital, $250,000; to manufacture carbureters. Incorporators: G. E. Parker, J. T. Clark.

BROOKLYN, N. Y.—Meyer's Garage, Inc.; capital, $1,000. Incorporators: Louis Meyer, Jas. E. Friel, Otto Schult.

BROOKLYN, N. Y.—Pitts Motor Car & Repair & Sales Corp.; capital, $24,000. Incorporators: Frank G. Pitts, Geo. C. Walbridge, Rodney C. Walbridge.

BUFFALO, N. Y.—Frontier Taxicab & Touring Car Co.; capital, $5,000. Incorporators: A. Carnevale, Samuel Geddis, Frank Conover.

CHESTER, W. VA.—Chester Rubber Tire & Tube Works; capital, $250,000; to manufacture tires and tubes.

CHICAGO, ILL.—Automobile & Cycle Trades Association; capital, $5,000. Incorporators: Livingston E. Osborne, J. Milton Tait, W. W. Love.

CHICAGO, ILL.—Metropolitan Appliance Co.; capital, $1,000; to manufacture and sell mechanical and electrical devices, etc. Incorporators: George W. LeVin, W. F. Cummings, W. J. Maher.

CINCINNATI, O.—Central Auto Repairs Co.; capital, $30,000. Incorporators: George F. Osler, Paul V. Connoly, Ira L. Cressler.

CLEVELAND, O.—Baxter-Frick Gear Cutting Mfg. Co.; capital, $25,000; to manufacture and deal in gears of all kinds. Incorporators: Archie K. Baxter, William H. Frick, Vincent A. Taylor, Oswald M. Hoch, Mrs. Grace Bartos.

CONNELLSVILLE, PA.—Connellsville Garage Co.; capital, $100,000; to do a general livery business. Incorporators: J. L. Evans, W. D. McGinnis, V. J. Clark.

GUELPH, ONT., CAN.—Peerless Rubber Co.; capital, $160,000; to manufacture and deal in rubber goods, rubber products, etc.

MONTREAL, CAN.—Michelin Tire Co.; capital, $40,000; to manufacture and deal in tires.

MUNCIE, IND.—Auto Parts Mfg. Co.; to sell a block type automobile motor, transmissions, clutches, levers and foot pedals. Incorporators: F. M. Boyer, J. P. Kandel, A. W. Tyler.

NEWARK, N. J.—M. A. Mullin Auto & Livery Co.; capital, $100,000; to do a general livery business. Incorporators: L. H. Vassant, W. F. King; J. H. Taylor.

NEW YORK CITY.—American Motorists' Protective Corp.; capital, $250,000. Incorporators: H. G. Reed, H. L. Sharp, J. W. Reilly.

NEW YORK, N. Y.—Simmons Auto Supply Co.; capital, $5,000. Incorporators: John S. Kelly, Geo. W. Lewis, Geo. W. Smith.

SPRINGFIELD, MASS.—Taxi Cab Service Co.; capital, $115,000. Incorporators: J. E. Costello, A. E. Williamson, F. B. Nichols.

TORONTO, ONT., CAN.—Uxbridge Foundry Co.; capital, $40,000; to carry on a general foundry business.

WALKERVILLE, ONT.—Heinze Electric Co.; capital, $50,000; to manufacture and deal in electric apparatus and supplies.

WORTHINGTON, O.—The Worthington Garage Co.; capital, $30,000; to operate a garage. Incorporators; Geo. W. Wing, Frank P. Welling, Madeline Wing, Lillian J. Welling, D. H. Welling.

CHANGES OF NAME AND CAPITAL

CHICAGO, ILL.—Dearborn Automobile Co.; change of name to M. & O. Auto Repair Co.

CHICAGO, ILL.—Just Rite Wash & Polish Co.; change of name to Just Rite Auto Wash and Polish Co.

MUNCIE, IND.—Muncie Gear Works; capital increased to $500,000.

New Agencies Established During the Week

PASSENGER VEHICLES

Place	Car	Agent
Albany, N. Y.	Herreshoff	Eugene F. Wilcox.
Athol, Mass.	Herreshoff	Athol Auto Station.
Baltimore, Md.	Ford	Eastwick Motor Co.
Boston, Mass.	Maxwell	F. E. Lucas.
Boston, Mass.	Velie	Velie Boston Co.
Brazil, Ind.	McFarlan	J. D. Pellum.
Brookfield, Mo.	Oakland	Byron K. Newcomb.
Burlington, Vt.	Herreshoff	Van Ness Garage.
Burlington, Ia.	McFarlan	Hawkeye Motor Car Co.
Calgary, Alberta, Can.	McFarlan	Diamond Motor Co.
Canton, Ill.	McFarlan	Meade McClatchey.
Catskill, N. Y.	McFarlan	Catskill Auto Co.
Chateaugay, N. Y.	Herreshoff	G. W. Foster.
Chicago, Ill.	McFarlan	Deibler Motor Car Co.
Cincinnati, O.	McFarlan	H. E. Langdon.
Columbus, O.	Ford	D. C. Cain.
Davenport, Ia.	McFarlan	Hawkeye Motor Co.
Decatur, Ill.	McFarlan	R. E. Barrow.
Denver, Colo.	McFarlan	L. D. McCall.
Des Moines, Ind.	McFarlan	Jenkins & Co.
Dubuque, Ia.	McFarlan	Dubuque Auto Supply Co.
Duluth, Minn.	Oldsmobile	Mutual Auto Co.
Earlville, Ill.	McFarlan	J. L. Headley.
Elizabeth, N. J.	Oakland	Louis Koplin.
Ephrata, Wash.	Overland	L. Tolliver.
Findlay, O.	Ford	Collingwood & Edwards.
Fresno, Cal.	McFarlan	J. C. Phelan.
Galion, O.	McFarlan	Galion Motor Car Co.
Germantown, N. Y.	Herreshoff	W. S. Lasher.
Green Bay, Wis.	McFarlan	Green Bay Motor Car Co.
Huntington, N. Y.	Oakland	Auffolk Electric Co.
Ili, Idaho	Detroiter	Harvey & Regan.
Jackson, Fla.	McFarlan	Roy W. Corbett.
Jacksonville, Ill.	McFarlan	D. Estaque.
Juliaetta, Idaho	Detroiter	Harvey & Regan.
Kewanee, Ill.	Oakland	Lyle H. Smith.
Lebanon, Pa.	Oakland	Lebanon Auto & Garage Co.
Lexington, Ky.	McFarlan	O. R. Crutcher.
Lima, O.	Ford	Bertrau & Fridely.
Littlestown, Pa.	International	Humbert & Krug.
Los Angeles, Cal.	McFarlan	Louis F. Benton & Co.
Los Angeles, Cal.	Rambler	Jeffery Auto Sales Co.
Louisville, Ky.	McFarlan	J. J. Caffrey.
Louisville, Ky.	Overland	Southern Motors Co.
Lowell, Mass.	McFarlan	Howard Street Garage.
Manila, P. I.	McFarlan	T. Jefferson Fox.
Manistee, Mich.	Oakland	C. G. Bigge.
Mechanicville, N. Y.	Herreshoff	W. H. Wood.
Middleboro, Mass.	McFarlan	Middleboro Auto Exchange.
Middletown, Conn.	McFarlan	S. M. Foote.
Milwaukee, Wis.	McFarlan	Grand Avenue Garage.
Minneapolis, Minn.	Meteor	MacArthur-Zollars-Thompson Co.
Minneapolis, Minn.	Read	Churchill & Schumacher.
Mitchell, S. D.	McFarlan	Mitchell Auto & Supply Co.
Montreal, Can.	Grant	Gareau Motor Car Co.
Montreal, Can.	McFarlan	Fournier & Redier.
Montreal, Quebec, Can.	Palmer-Singer	Gadbois Limited.
Morristown, N. J.	Oakland	Wm. Stevenson Garage.
Multnomah County, Ore.	Ford	Boone-Skinner Auto Co.
Muncie, Ind.	McFarlan	R. E. Stevenson.
New Orleans, La.	McFarlan	Jos. Schwartz Co.
Oakesdale, Wash.	Detroiter	Harvey & Regan.
Old Town, Me.	McFarlan	C. B. Swan.
Omaha, Neb.	McFarlan	Electric Garage Co.
Peabody, Mass.	Oakland	Renzi Garage Co.
Pearl River, N. Y.	Oakland	Heckerley & Vreeland.
Pittsburgh, Pa.	McFarlan	Williams-Hasley Motor Car Co.
Plainfield, N. J.	Oakland	Laing Machine & Auto Repair Co.
Plattsburgh, N. Y.	Herreshoff	Plattsburgh Gas & Electric Co.
Port Jefferson, N. Y.	Oakland	J. R. Fanning.
Portland, Ore	Herreshoff	Allshouse & McDowal.
Potsdam, O.	McFarlan	H. D. Ammon.
Railroad, Pa.	Gramm	H. Schroeder.
Raleigh, N. C.	Franklin	Raleigh Motor Car & Machine Co.
Rochester, N. Y.	McFarlan	Carthage Auto Co.
Roslyn, L. I., N. Y.	Oakland	Hewlett & Remsen.
San Diego, Cal.	McFarlan	R. C. Merriam.
Seattle, Wash.	Lyons-Knight	Hamilton Auto Co.
Sioux City, Ia.	McFarlan	Central Machine Works.
Sodus, N. Y.	McFarlan	Hanby-Pullman Auto Co.
Spencer, Ia.	McFarlan	F. F. Engle.
Spokane, Wash.	Henderson	J. C. Ryan.
Springfield, Ill.	McFarlan	Hunter Auto Service Station
St. Louis, Mo.	McFarlan	Collier-Reitz Motor Car Co.
Vancouver, B. C.	McFarlan	J. W. Pike.
Victoria, B. C.	Cartercar	M. J. Mitchell.
Wabaunsee, Kan.	Oakland	Anderson Bros.
Walla Walla, Wash.	Overland	J. D. Moore.
Waterloo, Iowa.	McFarlan	Waterloo Overland Co.
Watertown, Wis.	McFarlan	Buroff-Fuller Co.
Worcester, Mass.	McFarlan	H. B. Pulcifer.
Youngstown, O.	McFarlan	Wells Motor Car Co.

COMMERCIAL VEHICLES

Boston, Mass.	Velie	Velie Boston Co.
Los Angeles, Cal.	Jeffery	Jeffery Auto Sales Co.
Springfield, Mass.	Stewart	R. A. McKee.

CYCLE CARS

Eugene, Ore.	Imp	F. J. Berger.
Portland, Ore.	Imp	A. M. Beaver.

ELECTRIC VEHICLES

Louisville, Ky.	Ohio	Ohio Electric Agency.

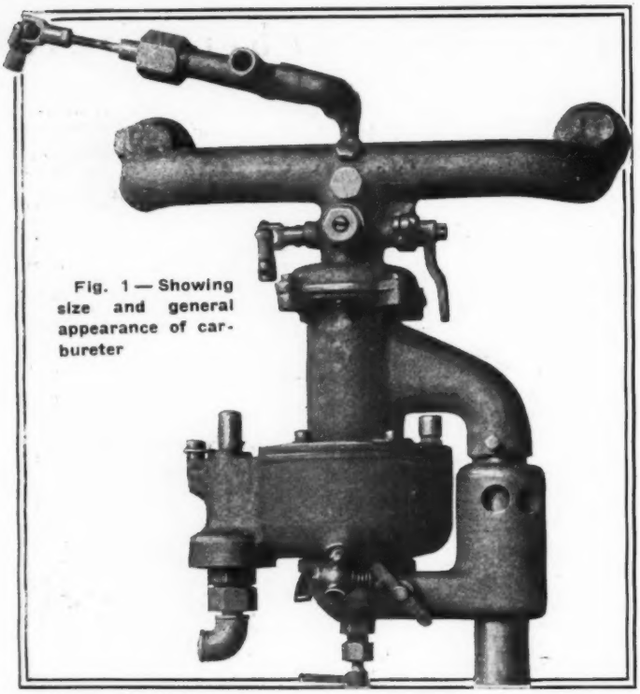


Fig. 1 — Showing size and general appearance of carbureter

Holley Makes Kerosene Carbureter

New Device Employs a Mixture of Gasoline and Kerosene for Starting—Kerosene Vaporized by Exhaust Heat

AFTER several years of experimentation with kerosene carburetion, the Holley Bros. Co., Detroit, Mich., has hit upon a design of instrument to handle low grade fuels which has just been announced. The new Holley kerosene carbureter is very little larger than the average gasoline type and due to its compact design is applicable to motors already in cars, and under ordinary conditions does not require any great change in the general construction of the manifolds.

The new Holley instrument utilizes the exhaust gas heat to vaporize the heavier and less volatile fuel, while for starting, an auxiliary gasoline carbureter which is a part of the kerosene carbureter as a whole is brought into play, being controlled from the dash. Since the kerosene portion of the apparatus is in action at all times, the starting fuel is therefore a mixture of gasoline and kerosene, the proportions being about three-fourths of the former to one-fourth of the latter. As the engine warms up, the exhaust gas is used to vaporize the kerosene, the proportion of this fuel being increased as the running continues until the motor is finally running on kerosene alone.

Kerosene Carbureter Gives Quick Acceleration

According to G. M. Holley, president of the Holley company, there is no hesitation in getting away due to the proportions of the two fuels. He states that it is necessary to leave the gasoline turned on from 1 to 4 minutes according to temperature conditions; 1 minute in average summer weather and 4 minutes in extreme cold winter weather. With the device it is claimed that there is absolutely no smoking unless the motor is missing, in which case a light grey puff will come out, which is the kerosene gas passed through the motor without being ignited.

The starting device of the new Holley carbureter practically consists of a floatless gasoline carbureter with a starvation type of atomizing nozzle at one end. This device is controlled from the dash and is worked in conjunction with the kerosene carbureter, which is always in action. Although about 75 per cent. of the mixture supplied to the motor is gasoline mixture when starting, when the throttle of the kerosene carbureter is opened as in driving a car, this proportion is decreased according to the throttle opening, so that at driving speeds, even when starting away, 50 per cent. of the mixture is kerosene mixture. Once the machine is running, the gasoline needle valve is thrown off from the dash. Fig. 1 shows the carbureter applied to the intake manifold of a motor.

Nozzle of Overflowing Type

Referring to Fig. 2, which gives the design of the gasoline part of the carbureter, B is the small gasoline tank which holds about a pint. A is the filler cap which has a gauze strainer to prevent particles from getting in to stop up the nozzle orifice; B_1 are the brackets for fastening to the frame of the car. Referring to the carbureter end, the main air entrance is at C, although the nozzle, which is of the atomizing type, obtains its air for the purpose through the vent D, which is capped to prevent dirt from gathering in the air nozzle E. The atmospheric feed F cuts down the gasoline flow as the velocity increases. G is the adjusting needle.

The nozzle tip H sets very low, and is of the overflowing type, which always has a suitable charge ready for starting. The mixture outlet is at I, and is connected up to the manifold of the motor, being manually controlled by a special form of needle valve connected to the dash.

Vaporization Aided by Exhaust Heat

The kerosene carbureter primarily is a vaporizer, the heat of the exhaust being used to convert the atomized kerosene into a true vapor. This heat is applied both externally and internally to the atomized kerosene. Referring to Fig. 3, the sectional view of the kerosene carbureter proper, the kerosene is introduced at the connection M, passing through the screen N and then through the inlet O, which is operated by a standard type of float mechanism, the level being maintained constant in the usual way.

The action of the mixing chamber is as follows: The exhaust gas enters at F, passes around the low speed tube R and the high speed tube L and emerges at S. The primary air enters at I and is heated by passing around the exhaust tube J. This goes over to the mixer chamber, at low speeds through the tube R supplied by the nozzle Q. As the butterfly valve is opened, the fuel is supplied from the nozzle K as well as from the nozzle Q. The atomized kerosene, as the speed increases, flows with the mixed air through the corrugated tube L, which is so constructed in order to present the greatest possible heated surface for a given length. At low speeds the auxiliary air valve D is

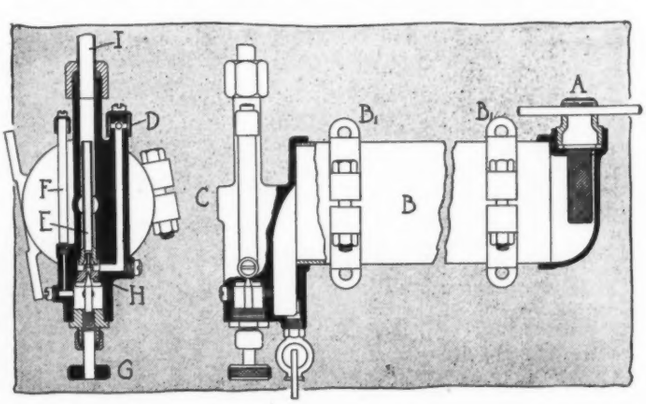


Fig. 2—Showing gasoline tank B, main air entrance C, and air nozzle E. The atmospheric feed cuts down the gasoline flow as the velocity increases

closed over the ports E, but as the suction increases this valve lifts proportionately and supplies whatever additional air is required.

Needle Valve Controlled from Dash

The installation of the Holley carbureter, starter and heating tube is shown in the diagram Fig. 4. The carbureter proper is at A; B is the gasoline starting device, while C is the tube connecting this gasoline part with the needle valve D which controls the flow into the manifold. This needle valve D is controlled from the dash through the rod E by the hand lever F, a universal joint being supplied on the rod E so that the angularity may be changed. The rod I runs from the throttle lever H to the throttle lever J on the exhaust pipe or exhaust manifold. This latter throttle lever should close the manifold valve when the throttle of the carbureter is closed and open it wide when the carbureter is wide open.

By this method, at low speeds all of the exhaust gases are forced to pass through the exhaust jacket containing the low speed tube R and high speed tube L (Fig. 3). The exhaust gases are supplied through the tube K, Fig. 4, which tube may be connected direct to the exhaust manifold or to the exhaust pipe. The exhaust outlet from the carbureter is at L, and this may be extended below the pan of the motor. The dash adjustment may also be connected to the needle valve lever M and the mixture thereby controlled.

Special Type for Ford

For the special application of this new kerosene carbureter to the model T Ford motor, the Holley people have modified the instrument so that the inlet manifold is integral with the carbureter, and a special exhaust manifold has also been designed.

Summing up the kerosene carbureter situation, George M. Holley says: "It is entirely practical at the present time to equip any car motor with a kerosene carbureter. It is simply a question of whether or not the user objects to handling an accessory in the form of a gasoline starter. In the past it has been felt that kerosene would be a serious objection on account of the odor from splashings in filling the tank. But with metal or wood floor boards or with the tank so situated that the kerosene is not splashed on absorbent parts of the mat, no objectionable odor is noticeable."

Kerosene must be considered just as satisfactory as gasoline as fuel for the automobile, when a little extra heat is supplied to aid in vaporization. Its heating value is about the same as gasoline and if combustion is complete the exhaust of a kerosene driven motor is absolutely odorless.

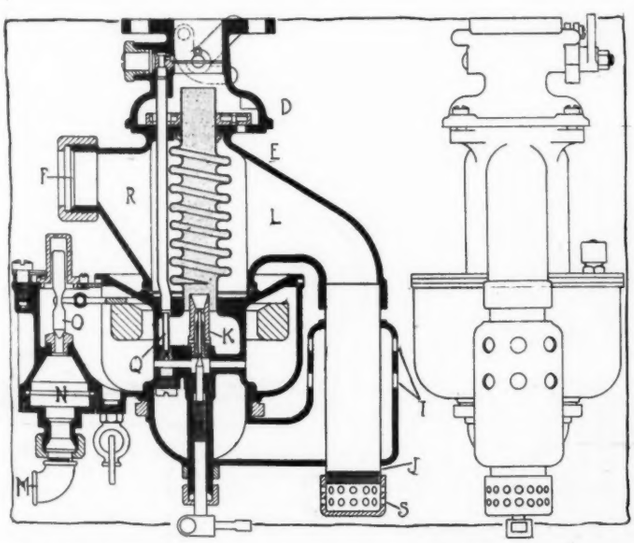


Fig. 3—At left, cross-section showing mixing chamber, float chamber and needle valve. At right an end elevation is given

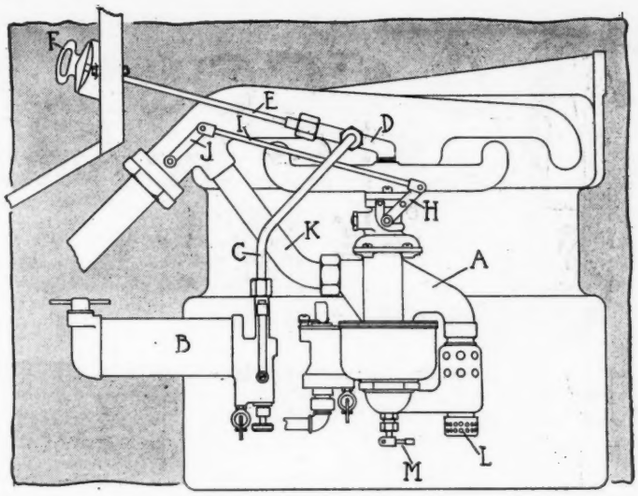


Fig. 4—Illustrating the complete apparatus, including the carbureter proper, gasoline tank B, valve J controlling the exhaust heat, and dash lever F for controlling gasoline for starting

A Pintsch Gas Substitute for Gasoline

Residue from Its Manufacture Makes Good Motor Truck Fuel When Mixed with Petroleum Oil

NEITHER gasoline nor kerosene is used by the Fort Worth Gas Co., Fort Worth, Tex. in the operation of two Commerce motor trucks. The discovery of a way to reduce the price of operation of motor trucks by the gas company is interesting. Especially is this so when it is known that the company brings about a saving of 30 per cent. in operation with a vast increase in power. The company manufactures Pintsch gas for railroad cars and residences and accumulates gallons of residue per day. This residue had been of no use at all and had been stored in great tanks for months awaiting the rise of the water in the river when it was allowed to run out. The residue is brownish in color, and in nature is hydrocarbon. By filtration through a small still the residue becomes white and when in this condition oil is mixed with it in the portion of two of the oil to one of the filtered mixture. The compound resulting brought an expense of but 11 cents per gallon and was tried with identically the same carbureter adjustment as gasoline. The result was perfect and a great saving was effected while the power of the trucks was increased almost one-third, according to the drivers. The only trouble which came from the use of the fluid was starting in chilly and cold weather, but the drivers simply spin the motor a little more in starting and rarely have any serious trouble. Some carbonization results but the carbon is soft and works away easily, giving no trouble. The company not only made enough of the material for its own use, but started to market it to other owners of motor trucks with profit. The gas companies of other cities when appealed to were found to have a residue also of this compound from Pintsch gas and when told of the discovery down in Texas immediately took steps to make a trial of the mixture to learn of its worth in their district.

Automobile parts—An American consular officer in a European country reports that a resident of his district is desirous of making business connections with firms in the United States making a specialty of automobile parts. File No. 11,123.

EDELMANN Hydrometer Syringe—With the idea of protecting the motorist, a handy device for testing the specific gravity of the acid in storage batteries is the latest offering of E. Edelmann & Co., 225 West Illinois street, Chicago, Ill. It consists of an ordinary hydrometer inclosed in a syringe, Fig. 4, the advantages claimed for this combination being that it is possible to obtain a sample of the acid easily and to read the hydrometer more accurately than if the uninclosed instrument were used. These claims are based on the fact that the ordinary hydrometer must be inserted in the storage battery which is often in an inaccessible or dark place, making it hard to read the scale, but with this new device it is only necessary to draw enough liquid into the syringe to float the hydrometer, when it may be removed from the battery and read by holding up to the light. It costs $1.25.

Neverout Lamp and License Bracket—A very neat and simple combination electric tail lamp and license bracket, Fig. 3 is made by the Rose Mfg. Co., Philadelphia, Pa. The lamp, of cubical shape, has a large red bull's eye in the rear, while a heavy plate glass window in the side provides sufficient illumination for the license tag. The tag is held in position by two slots in the bracket which fit over it on the top and one side, a butterfly nut fastening it solidly in place. It will be seen from the figure that any size of plate may be attached without requiring any adjustment; this device also has the advantage that only one nut is used to hold the license plate in place.

The Solitaire Top—A top, Fig. 1, that can be raised or lowered in 2 seconds by one person, with little or no effort, has been invented by Douglas E. Bonner, who is associated with the Pantasote Co. of New York City. With the dust cover removed, it is possible to put up the top with equal speed from any position within reach, from the front seat, the tonneau or the side of the car. All that is necessary is to give it a push and it literally falls into place. The top takes its support from the sides and back of the rear seat, while straps running from the front corners of the top to the fastenings on the windshield, dash or cowl are provided to give the necessary rigidity. This method of fastening the straps is superior to running them out front to some place on the fenders or frame, as they may be attached without climbing out of the car. Also the accessibility of the motor is impaired. There are no bows to interfere with passengers getting into or out of the car, while increased arm room is obtained for front-seat occupants, due to absence of the customary supports at each side.

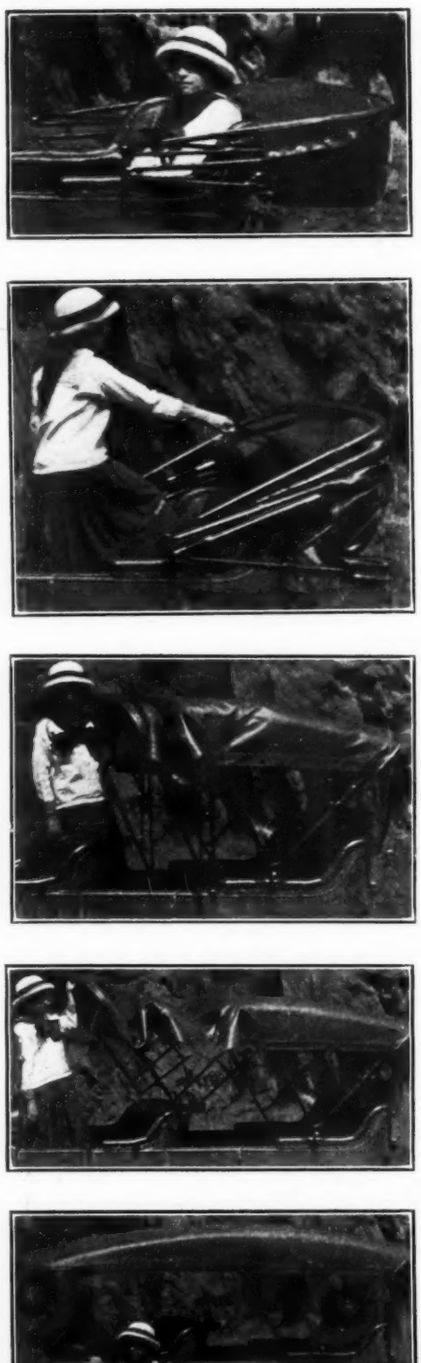


Fig. 1—Raising the Solitaire automobile top

The Pantasote company does not propose to make finished tops, but is prepared to furnish top makers and motor car manufacturers with the special sockets required for making Solitaire tops.

National Foot Scraper—The National Motor Supply Co., 5606 Euclid avenue, Cleveland, O., has designed a foot scraper which is adjustable to the running-board of any car. The scraper is held in place by two jaws, one at each end of the scraper blade, which slip over the edge of the running-board. These jaws are fastened securely to the running board by set screws which bear against the under side of the board. This device ought to appeal to the motorist who wants to keep his car clean in muddy weather.

Weston Volt-Ammeters—Small, light but accurate voltmeters, ammeters and volt-ammeters for use about garages where full-size instruments would be awkward to carry around, are made by the Weston Electrical Instrument Co., Newark, N. J. The voltmeter illustrated, Fig. 5, is for battery testing, having a needle that swings either way from the zero point in the center, but both voltmeter and ammeters may be had with one, two or three ranges with any maximum of voltage or amperage. At the left is a volt-ammeter with range of 3, 15 and 150 volts, and 3, 15 and 30 amperes. Voltage is only indicated by the needle when the button at the left is depressed. The moving elements of all these instruments are very light and consequently the wear on the pivots and jewels is a minimum. The instruments operate on the permanent magnet principle, allowing the scales to have uniform divisions, thus making for greater accuracy in reading. Provision has been made to compensate for changes in tem-

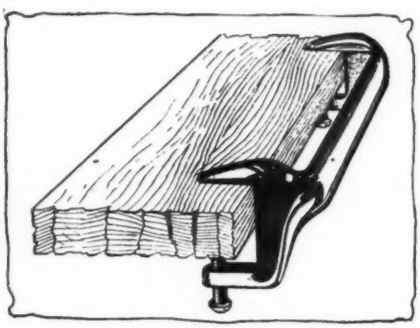


Fig. 2—National foot scraper for attachment to the running board

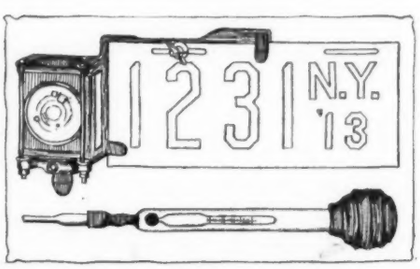


Fig. 3—Above, the Neverout combination tail lamp and license bracket in which the license tag is held rigidly in an extension of the lamp frame by a single thumb nut

Fig. 4—The Edelmann hydrometer syringe by which the condition of a storage battery can be quickly ascertained

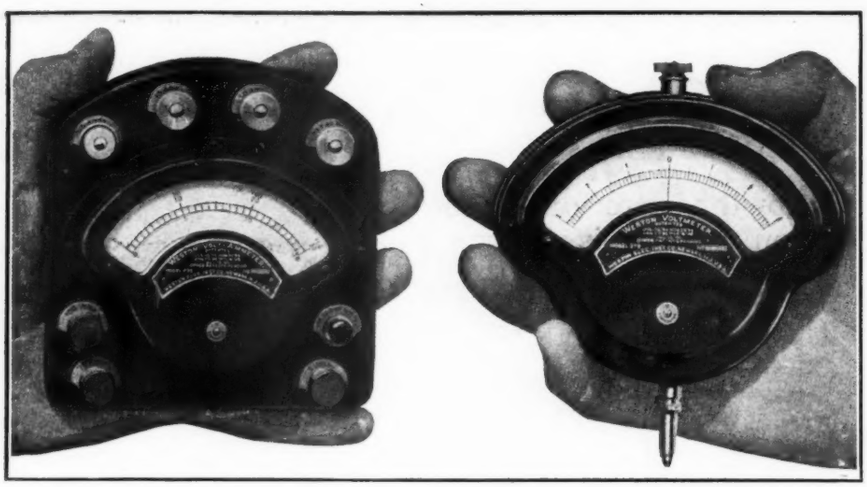


Fig. 4—Compact Weston volt-ammeter and voltmeter of handy size for garage use

perature and a dead beat pointer is used. By a dead beat pointer is meant one that moves to the correct point on the scale, when a reading is to be taken, without vibrating around this point more or less before coming to rest. All instruments have a small screw in the center of the case by turning which the pointer may be brought back to zero.

Hartmann Rotary Switch—The Hartmann Electrical Mfg. Co., Mansfield, O., has brought out a new automobile lighting switch, Fig. 5, which has several novel features. The switch is of the rotary type, with a positive stop at each lighting combination, so that in rotating the handle the driver can tell at night from the "feel" when it has reached any desired combination of lights. Ordinarily, the three combinations provided are side-tail, head-tail and all-lights. A special combination is also made, which at the first step gives the left-side and tail lamp, so that the car can be left standing at the curb with only one side lamp burning. This saves current and at the same time complies with the law. Dimming is effected by changing from the parallel to a series connection, which gives half voltage at each lamp and cuts the current consumption in two. Change in connection is made by means of contacts mounted on the terminal ring and operated by the center push and pull button. When it is desired to dim the headlights it is necessary merely to pull this button out. With a dimmer of this kind the headlights can be used in place of the side-lights when the car is left standing at the curb, as the current consumption is only slightly in excess of the usual 4 candlepower side-lights. The switch is also made with center push and pull button, controlling an extra circuit such as a meter lamp, or an inside lamp for closed cars.

Success Carbon Removing Tools—Brown Bros., London, Eng., are making a handy set of tools, Fig. 6, for scraping the carbon out of cylinders without taking down the motor. The outfit consists of individual scrapers for the cylinder head, top of the piston and valve chamber, and a brush for sweeping the carbon out of the latter. The scraper for the cylinder head is made of a strip of steel about 18 inches long bent so that it will go into the cylinder easily, with a suitable handle on one end and the other end turned up and having three little prongs which cut the carbon from the cylinder walls. The tool for the piston top is similar except that the scraping end is bent down instead of up. The scraper for the valve chamber is just a small flat strip, with the end tapered to enable it to get into the corners. After the carbon is thoroughly loosened by these tools it should be blown from the cylinder by inserting the nozzle of a hand pump into one side of the valve chamber, and giving the pump two or three vigorous strokes. This will set up a swirl and blow all the carbon particles back out into the valve chamber where they may be easily brushed out.

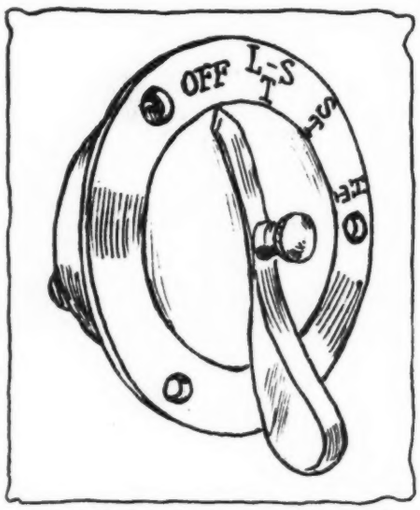


Fig. 5—Hartmann rotary switch providing for three different combinations of lights. A similar switch is also made arranged for dimming the head lamps or cutting out one of the side lamps by simply pulling out the button fitted on the switch

Western-Electric Spark Plug—A new spark plug, Fig. 6, which, the makers claim, contains all the advantages of the mica plug with the high insulating qualities of the porcelain type is made by the Western Electric Co., New York City. The peculiar feature embodied in this is the unusually long path along the joint between the mica and the porcelain which prevents leakage of electricity. The upper portion of the insulating material is of mica and the lower is a large piece of porcelain. The mica core fits into a deep well in the porcelain so that the path along the joint from the center electrode to the shell is absolutely gas-tight. The shell is unusually heavy and is nickel plated to prevent rusting.

Edelmann Grease Cup—A new grease cup of the screw-operated, plunger type has just been announced by E. Edelmann & Co., Chicago, Ill. In this cup the screw is threaded into the piston and held by a collar in the cup casing instead of having the thread in the casing and the collar on the plunger. The advantage of reversing the construction this way is that the screw is inside the casing and therefore the possibility of breakage by catching on passing obstructions is greatly lessened. A simple locking device to prevent the loss of the cup casing is employed, consisting of a spring ring riveted to the base of the cup at one side and having a projection on the other side which fits into notches cut into the cup casing. The cup may be had with either a brass or nickel finish, at a price no higher than for the ordinary type. It is distributed in the East by Asch & Co., 1777 Broadway, N. Y.

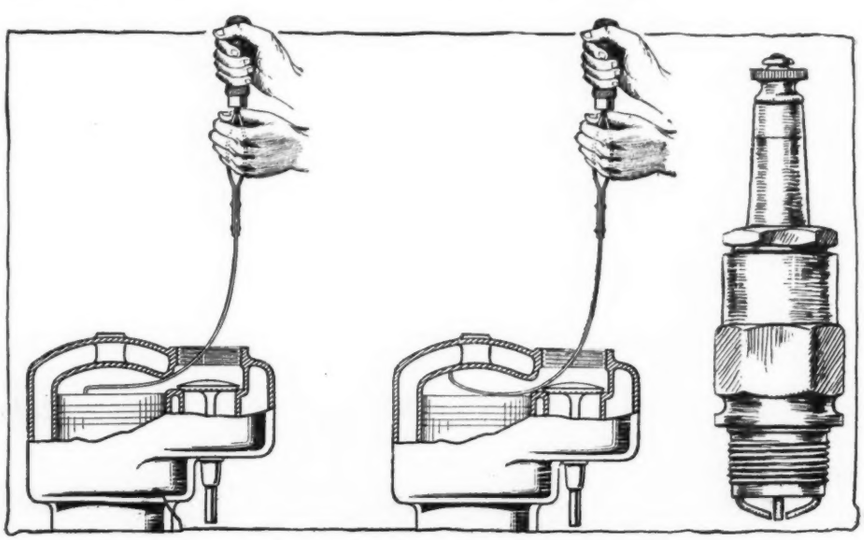


Fig. 6—Success tool for removing the carbon from cylinder and piston head.
Fig. 6—Western spark plug